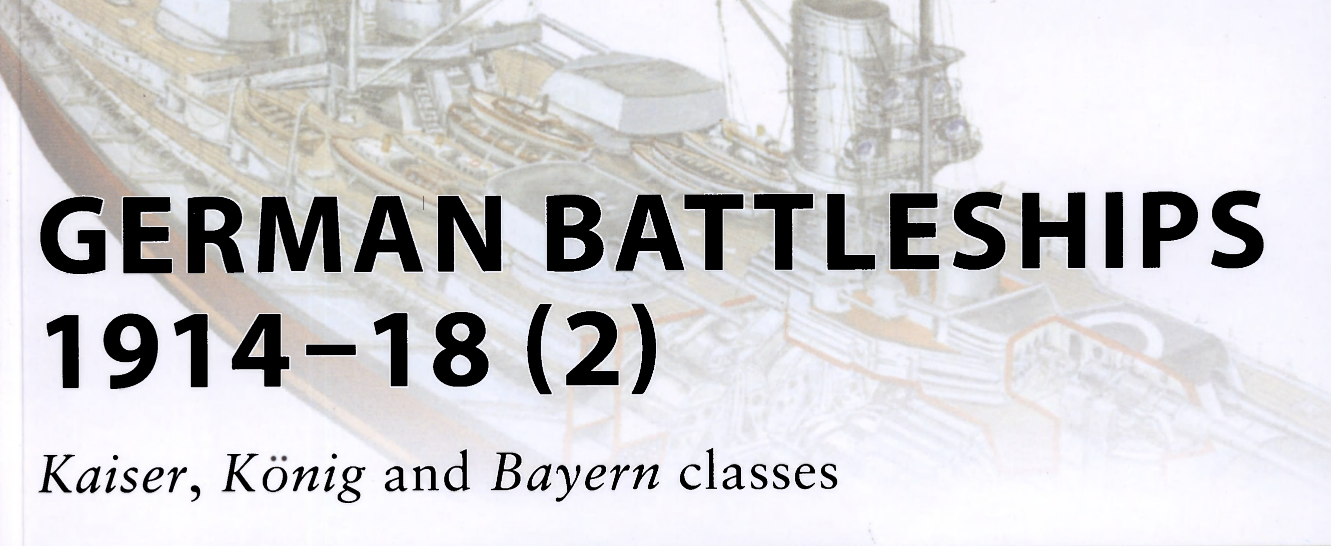
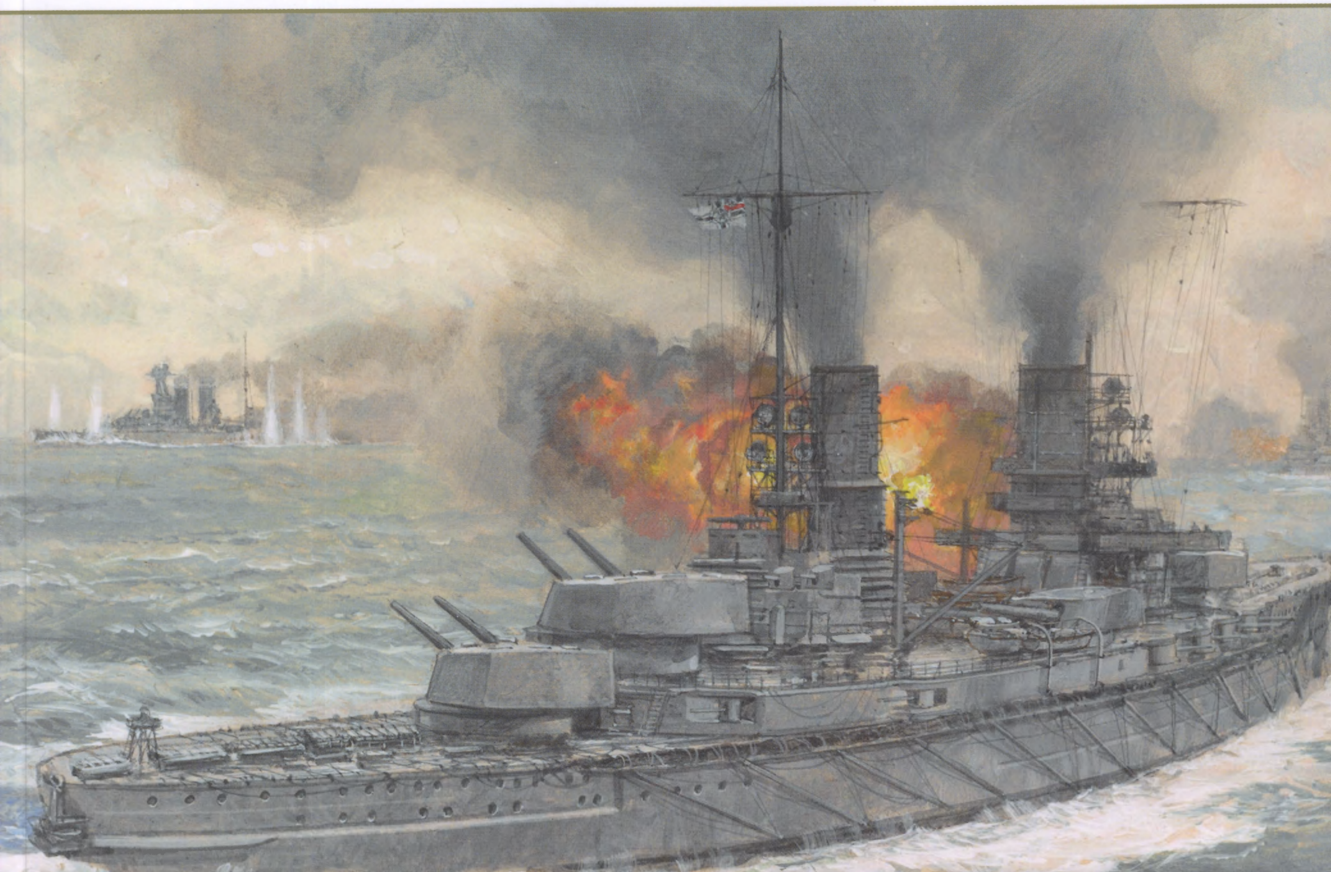


GERMAN BATTLESHIPS 1914–18 (2)

Kaiser, *König* and *Bayern* classes



GARY STAFF

ILLUSTRATED BY PAUL WRIGHT

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GARY STAFF has had a life-long passion for the history of the German Imperial Navy and has translated many contemporary and original documents on the subject. He contibuted to a Channel 4 documentary on Jutland, exploring the Imperial Navy's experience of the battle. He grew up in Australia and currently lives in Melbourne.

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GERMAN BATTLESHIPS 1914–18 (2)

Kaiser, *König* and *Bayern* classes

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ILLUSTRATED BY PAUL WRIGHT

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GERMAN BATTLESHIPS 1914–18 (2)

KAISER, KÖNIG AND *BAYERN* CLASSES

BATTLESHIPS OF THE *KAISER* CLASS

While the financial expenditures for British dreadnought building fell for 1908/09, the opposite trend was apparent in Germany. The main reason for the increase was that in Britain the three units of the *St Vincent* class remained almost identical in their specifications to the preceding class, but in Germany the *Helgoland* class represented the second generation of dreadnoughts, with armament enhanced to international standards. As the Royal Navy changed from the 12in to the 13.5in gun, the cost of ships rose by about 23 per cent. The Imperial Navy attempted to hold costs constant for the ships of the 1909 budget. This cost restriction, however, could impede technical development.

Once again, the question of turret arrangement came about. Tirpitz still favoured the 'American arrangement' of superfiring turret groups, which gave an increased broadside with the same number of barrels, but it appeared that political and cost considerations would preclude such an arrangement. On 3 July 1908, Geheimer Baurat (Confidential Construction Advisor) Hans Bürkner offered a remarkable compromise, which included the type of technical improvements desired by Tirpitz, and also worked within the financial restraints of the naval budget. Bürkner suggested deleting one turret, for a total of five, and positioning the midship turrets en-echelon, instead of in the hexagonal arrangement. The displacement saving would be about 1,600 tonnes and cost saving 4.4 million marks. However, many in the Reichs Marine Amt (Naval Office; RMA) opposed this idea, their views perhaps being influenced by the fact that young Bürkner was personally appointed by Tirpitz. Nevertheless, it was not until January 1909 that Tirpitz finally accepted the five-turret arrangement, mainly on financial grounds. In any case, the new battlecruisers had such an arrangement, and when it became known that the British had also adopted it with *Neptune* the choice appeared more acceptable. Although the option of triple turrets was raised, that was quickly rejected on the basis of cost. The naval estimates for the battleship of 1909, *Ersatz Hildebrand/Kaiser* (the first title is the ship's budget name), were passed in March 1909.

Several German companies had been encouraged to develop naval turbines, once again to prevent a monopoly, like the expensive Parsons patent, which cost £1million per ship. Nevertheless the RMA purchased a Parsons patent in 1908, so that they could act as price regulator. The firms of A.G. Vulcan, A.E.G. Curtis, Krupp Germania and Schichau all produced turbines, some of the impulse/reaction design, some of the reaction type. The type of design was left open, but it was quickly decided that three shafts would be used, as in previous battleships.

A further technical innovation was incorporated in *Ersatz Odin/Prinzregent Luitpold*. It was decided to install a diesel engine on the centre shaft – this fitment was of enormous significance, because two completely new engine plant systems were being trialled at the same time. The use of a 12,000hp diesel offered substantially better fuel economy and extended range, saving in personnel and in space and weight. A diesel could also provide maximum output very quickly, but the protective effect of coal storage was lost. To utilize the surplus steam that was available, *Prinzregent Luitpold* would have larger turbines on the wing shafts. Unfortunately, the large-size diesel engines were not available in time and *Prinzregent* was completed with a vacant centre engine room.

The battleship *Kaiser* tied up in Wilheimshaven in 1913 and flying the flag of Konteradmiral Ehrhard Schmidt

Armament

The heavy artillery of the *Kaiser* class consisted of 10 x 30.5cm SK L/50 C/08, which were set in Drh.L C/1909 mounts. As originally installed, the mounts allowed an elevation of +13.5° and depression of -8°, which gave a range of 187 hectometres (hm), according to Schmalenbach in *The History of German Ship Artillery*. In 1916 the mounts were altered to give an elevation of +16° to -5.5°, providing an increased range of 204hm. A total of 860 shells were carried, for an outfit of 86 shells per barrel. During World War I, the munition propellant charge came in two parts, a fore charge and a main charge. The fore charge was in a silk bag and consisted of 34.5kg of RP C/12

The battleships *Kaiser* and *Friedrich der Große* moored in Kiel before the war.

	Kaiser	*Friedrich der Große*	*Kaiserin*	*König Albert*	*Prinzregent Luitpold*
Building dockyard	Imperial, Kiel	A.G. Vulcan, Hamburg	Howaldtswerke, Kiel	F. Schichau, Danzig	Germaniawerft, Kiel
Budget name	*Ersatz Hildebrand*	*Ersatz Heimdall*	*Ersatz Hagen*	*Ersatz Agir*	*Ersatz Odin*
Building number	35	310	530	857	167
Keel laying	September 1909	26 January 1910	July 1910	17 July 1910	October 1910
Launched	22 March 1911	10 June 1911	11 November 1911	27 April 1912	17 February 1912
Commissioned	1 August 1912	15 October 1912	14 May 1913	31 July 1913	19 August 1913
Displacement (tonnes)	Designed: 24,724 Loaded: 27,000	Designed: 24,724 Loaded: 27,000	Designed: 24,724 Loaded: 27,000	Designed: 24,724 Loaded: 27,000	Designed: 24,724 Loaded: 27,000
Length (metres)	172.4	172.4	172.4	172.4	172.4
Beam (metres)	29.0	29.0	29.0	29.0	29.0
Draught (metres)	8.8	8.8	8.8	8.8	8.8
Moulded depth (metres)	14.4	14.4	14.4	14.4	14.4
Engine plant	3 sets Parsons turbines, built Imperial Dockyard, Kiel	3 sets A.E.G. Curtis turbines	3 sets Parsons turbines, built Imperial Dockyard, Kiel	3 sets Schichau turbines	2 sets Parsons turbines, built Imperial Dockyard, Kiel
Performance (shaft horsepower)	Designed: 28,000 Maximum: 55,187	Designed: 28,000 Maximum: 42,181	Designed: 28,000 Maximum: 41,533	Designed: 28,000 Maximum: 39,813	Designed: 28,000 Maximum: 38,751
Revolutions per minute	279	272	268	262	272
Speed (knots)	23.46	22.44	22.3	22.15	21.7
Fuel (tonnes)*	Construction: 1,000 Maximum: 3,600 Oil: 200	Construction: 1,000 Maximum: 3,600 Oil: 200	Construction: 1,000 Maximum: 3,600 Oil: 200	Construction: 1,000 Maximum: 3,600 Oil: 200	Construction: 750 coal/100 oil Maximum: 3,200 Oil: 400
Range (nautical miles)	7,900 at 12 knots	7,900 at 12 knots	7,900 at 12 knots	7,900 at 12 knots	7,200 at 12 knots
Cost (millions of gold marks)	44.997	45.802	45.173	45.761	46.374
Compartments	17	17	17	17	17
Double bottom (as percentage of length)	88	88	88	88	88
Crew	41 officers, 1,043 men As flagship another 14 officers and 80 men	41 officers 1,043 men	41 officers 1,043 men	41 officers 1,043 men	41 officers 1,043 men

*Coal, unless otherwise indicated

cordite ('RP' indicated tubular powder propellant). The main charge came in a brass cartridge case with an igniter and consisted of 91kg of RP C/12 cordite. These charges allowed the 405.5kg armour-piercing shell to be fired at the excellent muzzle velocity of 855mps, and the rate of fire was a rapid three rounds per minute.

The medium-calibre artillery consisted of 14 x 15cm SK L/45 in MPL C/06 pivot mounts. As completed they were ranged to 135hm, but this was increased to 168hm in 1915. A total of 160 high-explosive and armour-piercing shells were carried per gun, for a total of 2,240 shells. The weight of the projectile was 45.3kg and a rate of fire of 3–4 rounds per minute could be achieved. Even with the high muzzle velocity of 835mps, the barrel life was still approximately 1,400 rounds.

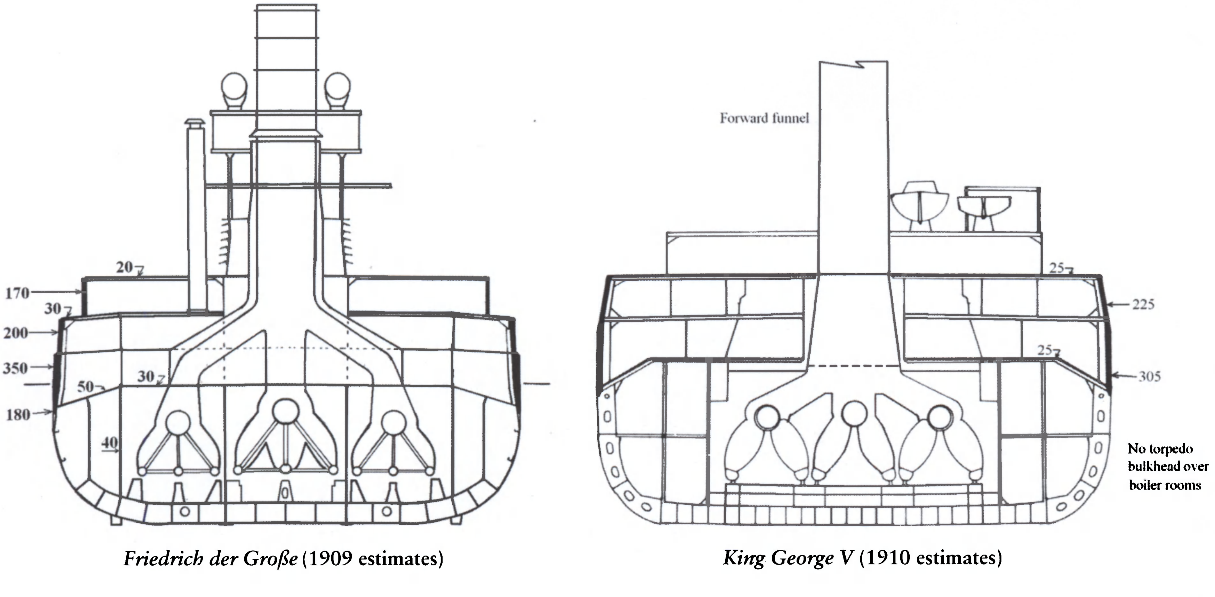
Eight 8.8cm L/45 MPL C/06 and four 8.8cm SK L/45 C/13 Flak guns were also mounted. The latter were excellent weapons, and could fire their 9kg shells at a rate of 15 rounds per minute; a total of 2,800 rounds were carried. During the war, the 8 x 8.8cm anti-torpedo boat guns were removed and their apertures were closed over.

A total of 5 x 50cm torpedo tubes were mounted, with an outfit of 19–20 torpedoes. The torpedo carried was the 50cm-diameter G/6c torpedo. This had a length of 6m and carried a warhead weighing 160kg. The range of this weapon was 5,000m at 27 knots and 2,200m at 35 knots.

Eight 110cm searchlights were mounted in two groups on pedestals adjacent to the fore- and main masts. They operated at 120 amperes.

Armour

In autumn 1908, the Artillery Trials Commission conducted firing trials against the target ship *Jupiter*, and Krupp conducted trials against a manufactured ship section at the range at Meppen. These trials revealed interesting information about armour plates then in use. It was learned that armour of 300mm thickness, with a coal load behind it, provided no protection against the 28cm armour-piercing shell at medium range. At the same time, there were persistent rumours that the British ships would soon mount 13.5in Quick-Firing (QF) cannon. Therefore, the belt armour of the *Kaiser* class would have to be thickened, and it was recommended that the sloping armour (*Böschung*) be mounted at a more acute angle to deflect shells. Therefore the main belt armour was increased in thickness to 350mm, tapering to 180mm at its lower edge. The forward and aft belt armour was 180mm. The upper belt, or citadel, armour was 200mm, casemate side armour was 170mm, and transverse armoured bulkheads were 300mm thick. The upper deck armour over the casemates was 30mm thick, as was the main armoured deck. The sloping deck armour was 50mm thick. The torpedo bulkhead armour was increased to 40mm. The turret faces were 300mm, sides 250mm and the roofs were 110mm thick. Barbette armour was 300mm thick, but as with all ships of this period, this depth was



Friedrich der Große (1909 estimates)

King George V (1910 estimates)

Comparison of armour thicknesses of *King George V* and *Friedrich der Große*, in millimetres. It can be seen that not only does the German battleship have much thicker armour, it is also spread over a much larger area. The British ship does not possess a torpedo bulkhead, but has armoured screens in the vicinity of the magazines and engines rooms. The large number of compartments on the German ship is also clearly evident. The British ship had no medium-calibre battery, whereas *Friedrich der Große* had a 15cm battery mounted in an armoured casemate.

reduced where the barbette was protected behind belt armour. The forward conning tower was a maximum 400mm, the aft conning tower 200mm. These battleships carried very thick armour, much thicker than their contemporaries in foreign navies.

Seakeeping

The ships of the *Kaiser* class had a metacentric height of 2.59m – they were known to be very good sea ships, but were very stiff because of this height (they would pitch somewhat in a swell). They quickly answered the helm and turned well, and with hard rudder there was a 66 per cent speed loss and 8° heel. There was little speed loss in a swell. Two of this class crossed the Atlantic in late 1913/early 1914 and had little trouble with either the Atlantic swell, nor rounding Cape Horn.

Machinery

The first four ships of the *Kaiser* class had 16 naval, coal-fired boilers, and these were the first to be fitted with supplemental oil firing from the beginning. They provided steam at the normal pressure of 16 atmospheres, or 235psi. The boilers were arranged into four boiler rooms. From aft, I boiler room – six boilers; II boiler room – one boiler; III boiler room – six boilers; IV boiler room – three boilers. The outboard boilers in the forward-most IV boiler room were of reduced width and had only two water drums.

The first four ships of this class had three sets of turbines, produced by various manufacturers, arranged in three engine rooms. The high- and intermediate-pressure turbines were in the forward turbine rooms, while the low-pressure and astern turbines were in the aft turbine room, together with the main condensers. The turbines drove three propellers of 3.75m diameter.

Prinzregent Luitpold had only two sets of Parsons turbines driving two 4m-diameter propellers, and fed from 14 naval boilers with supplemental oil firing. The third engine room was to have housed a Germania 6-cylinder, 12,000hp two-stroke diesel motor, driving a 3.75m-diameter propeller, which would have given a cruising speed of 12 knots on its own. Nevertheless, development of this engine took longer than anticipated, and it was not ready until 1917. Therefore the centre engine room remained empty.

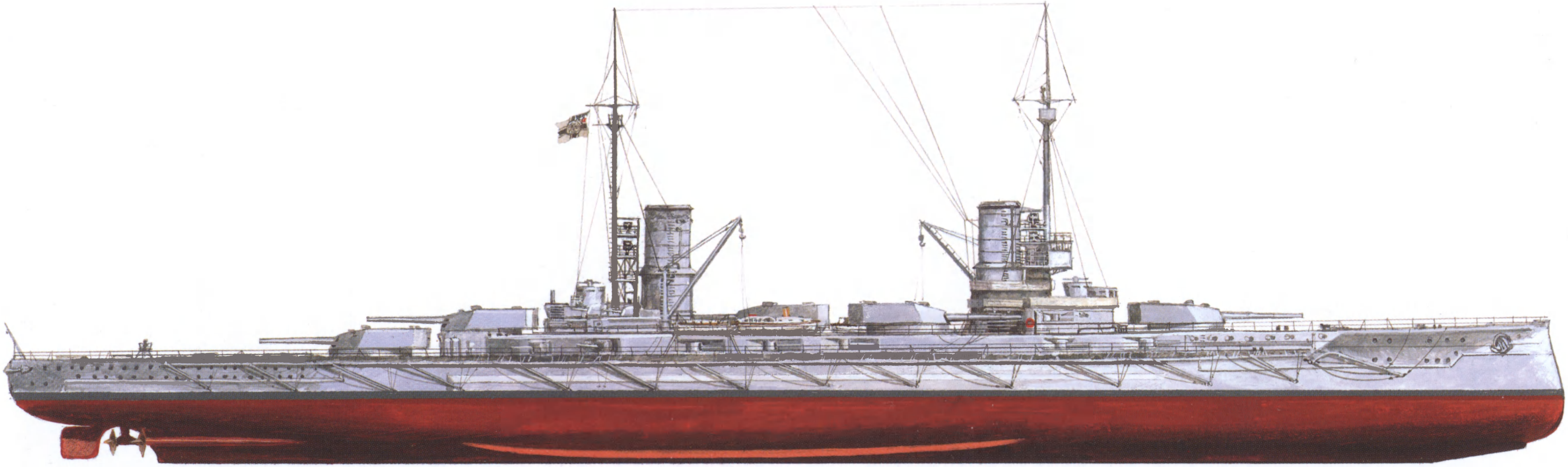
A

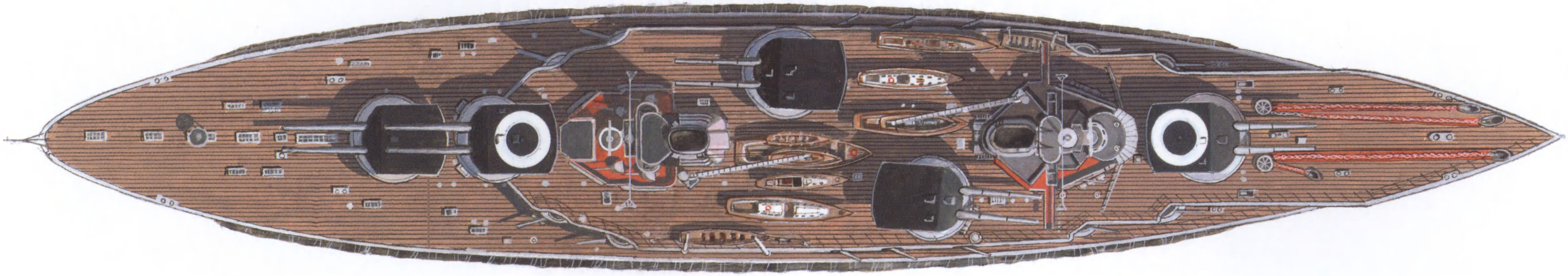
KAISER CLASS

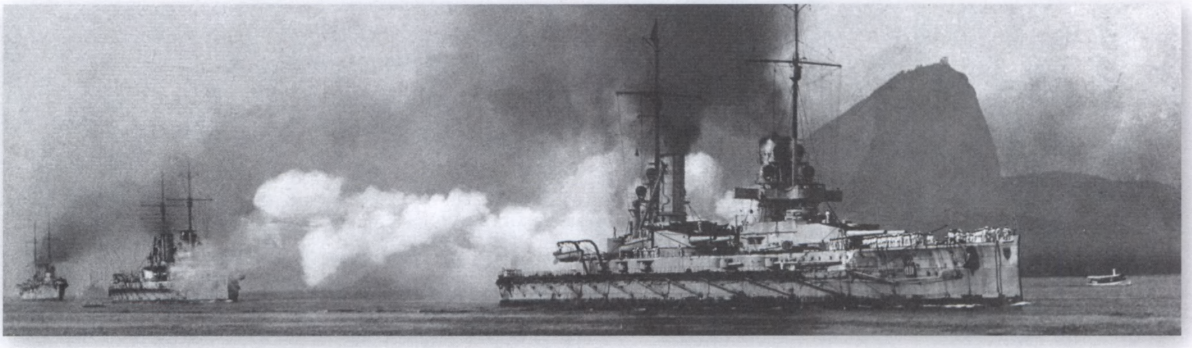
The quantum leap as far as German battleship building went was from the *Nassau* class to the *Helgoland* class, and the following *Kaiser* class did not represent such a great increase in displacement or cost. In fact, the displacement increase was just around 2,000 tonnes, and the building price actually fell from about 46 million marks to about 45.5 million on average. This cost decrease was mainly due to a reduction in armament from 12 to 10 x 30.5cm pieces. However, because the centre two turrets were mounted en-echelon the weight of the broadside of the *Kaiser* class actually increased to 10 x 30.5cm barrels, instead of eight with the previous class.

On the other hand, the thickness of the armour was increased to a scale never equalled by foreign builders during this period, either by the British *Royal Sovereign* class or the American *Nevada* class, both later designs. The extent of the German armour was also much greater. The introduction of turbine propulsion for the first time on German battleships meant that on average the German ships were 1 knot faster than the English class and 2 knots faster than their American counterparts. Therefore the *Kaiser* class were a lethal combination of armament, speed and staying power.

The *Kaiser* class provided reliable service during World War I, taking part in all the major actions and operations of the High Sea Fleet. At the Skagerrak battle, they were not truly tested, as only *Kaiser* was struck by one heavy shell, which caused little damage. Likewise, contrary to all the other classes, they were never tested by underwater torpedo or mine hits during the entire war.







Kaiser, flying the flag of Konteradmiral von Rebeur-Paschwitz, enters Rio de Janeiro followed by *König Albert* and the small cruiser *Straßburg*, in February 1914. *Kaiser* is firing a salute.

The two rudders were mounted parallel to one another, and were driven by two steam-powered rudder engines. There were four double turbo-dynamos, and two diesel dynamos providing 1,800kW of power at 225 volts.

General characteristics and changes

All ships had spotting tops installed in 1914. During 1913/14 *Friedrich der Große* had a large signal/parade deck mounted above the aft conning tower. At the end of 1914, the mantel of the forward funnel was raised 1m, while *Prinzregent Luitpold* was built with a 1m higher forward funnel mantel. *König Albert* had steam pipes on the sides of both funnels. Finally, in 1918, *Friedrich der Große* and *Kaiser* were fitted with heavy tubular foremasts, with an artillery direction position and rangefinder mounted atop them.

Service record

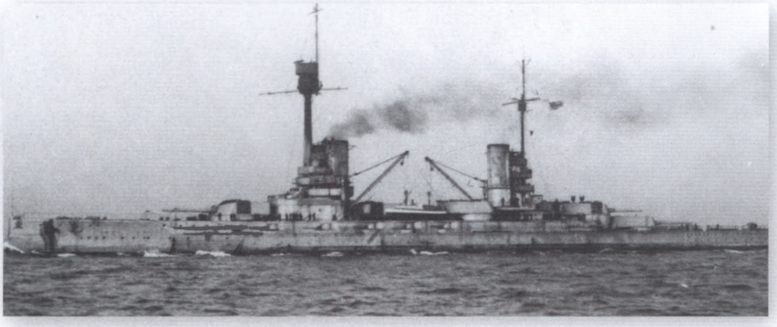
Kaiser

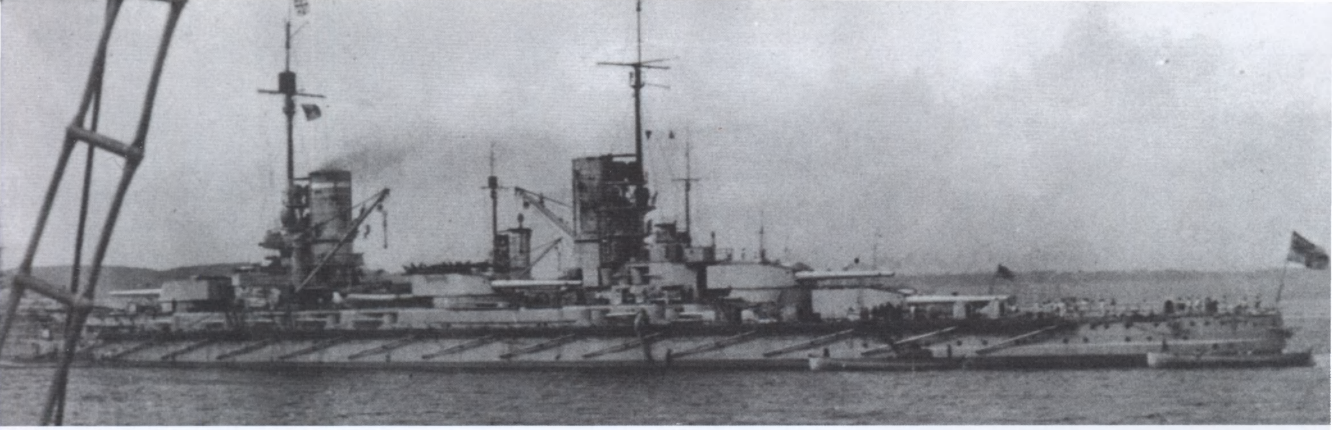
In September 1909, the Imperial Dockyard, Kiel, began construction of *Kaiser* and she was ready for launching on 22 March 1911, the birthday of Kaiser Wilhelm I. In the presence of Kaiser Wilhelm II, the Reich Chancellor, von Bethmann-Hollweg, gave the baptism speech, while the Kaiserin, Auguste Victoria, carried out the christening. On 1 August 1912, the ship was commissioned and commenced trials, which were concluded on 7 December 1912. *Kaiser* was completed as a Divisional Flagship.

On 8 December 1912, *Kaiser* had her crew made up with men from *Braunschweig* and *Elsaß*. She was assigned to V Division and had Kiel as her home port. Individual training followed and in February 1913 she went to Wilhelmshaven with *Friedrich der Große*. *Kaiser* now participated in all the normal training: exercises in March/April in the North Sea, artillery training in the Baltic in April, fleet exercises in May, Kiel Week regatta in June, where King Victor Emmanuel of Italy and the Kaiser inspected the ship. In July/August there was the summer cruise to Norway, and in August/September the autumn manoeuvres.

To trial the new turbine plants, it was decided to form a 'Detached Division' to undertake an Atlantic cruise. The division would consist of *Kaiser*, *König Albert* and the small cruiser *Straßburg*. On 9 December 1913, the journey began and proceeded via West Africa to South America. The division visited Lomé in Togo,

Friedrich der Große, showing the heavy tubular foremast with which she and *Kaiser* were fitted, the only ships of their class to have this feature. The battleship is serving as flagship for Konteradmiral von Reuter.





Kaiser moored in Kiel in 1915.

Victoria and Duala in Kamerun (modern Cameroon) and Swakopmund and Lüderitzbucht in South-West Africa (modern Namibia). From there they went to South America via St Helena, making fast in Rio de Janeiro on 15 February 1914. After great ceremonies, *Straßburg* went to Buenos Aires in Argentina, before rejoining *Kaiser* and *König Albert* in Montevideo in Uruguay.

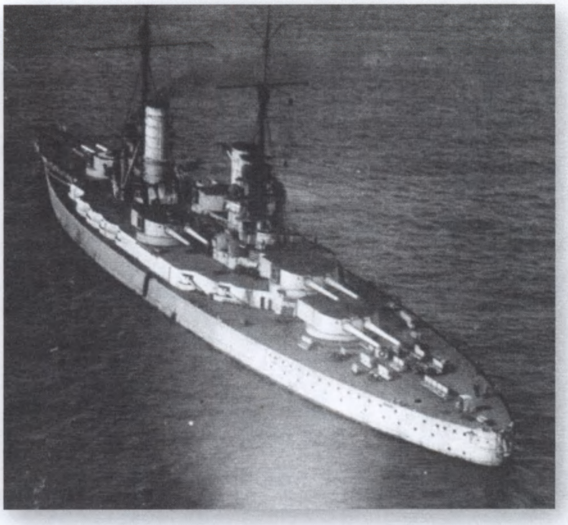
After rounding Cape Horn, the division visited Valparaiso in Chile from 2–11 April 1914. From there the homeward journey was begun and several more harbours were visited, including Bahia Blanco and Santo. On 16 May, the battleships departed Rio de Janeiro and travelled via Cape Verde, Funchal/Madeira and Vigo to Kiel, which they reached on 17 June 1914, having travelled around 20,000 nautical miles without serious disruption. On 24 June, the Detached Division was dissolved and the two ships returned to III Squadron.

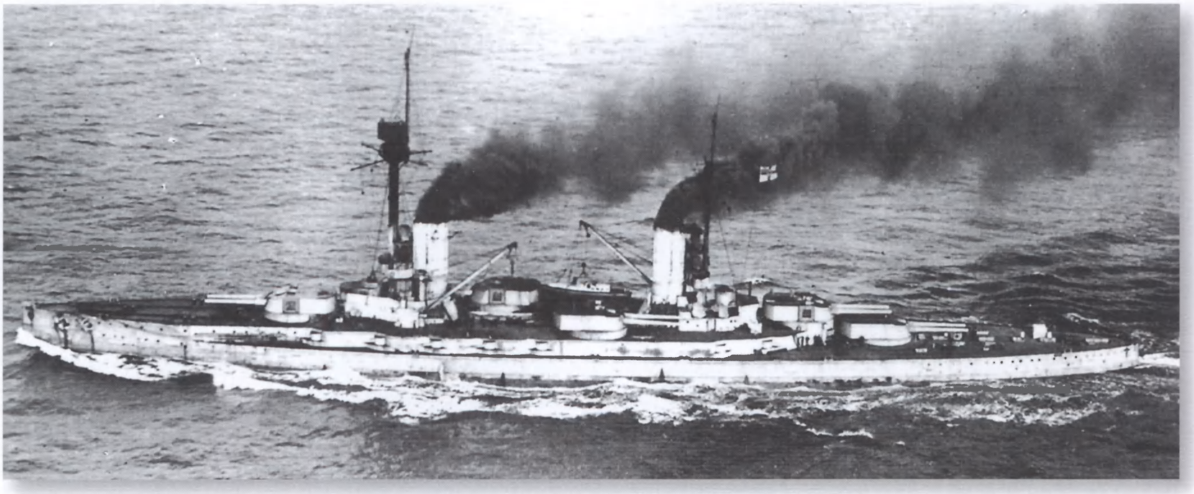
In July, *Kaiser* took part in squadron exercises and then the cruise to Norway. After the outbreak of war, she was involved in the advances of 2/3 November and 15/16 December against the English coast. She took part in all the advances of 1915, except the advance of 17/18 May, when she lay in the dockyard at Kiel. In 1916 *Kaiser* sailed in the advance of 5/7 March and on 22 March, while lying in Kiel, was lightly rammed by *Hannover*. She took part in the fleet advances on 26 March and 2/3 April, and further advances on 21/22 April and 24/25 April 1916.

During the Skagerrak battle (battle of Jutland, 31 May–1 June 1916), *Kaiser* was quite active. She was one of the battleships that took *Defence* under fire, and afterwards fired on *Warspite*, obtaining a hit that caused the English ship to circle out of control. In return, *Kaiser* was hit once at the lower edge of the No. 7 15cm gun casemate armour. The shell did not detonate properly and there was little damage. *Kaiser* next took part in the advance of 18–20 August and then the advance of 18–20 October 1916. On 4 November, she sailed in the advance on the west coast of Denmark to assist the stranded U-boats U-20 and U-30.

On 1 December 1916, the German surface forces were reorganized and *Kaiser* transferred to the newly formed IV Battle Squadron. She remained flagship of the II Admiral until the end of the war. In 1917 the main focus of naval activity was the U-boat and mine war. The fleet conducted exhausting picket duty and security duty and was held in a constant state of readiness. In May *Kaiser* went for a period in dock.

Kaiser anchored on Wilhelmshaven Roads on 30 August 1918.





An aerial view of SMS *Kaiser* after the stepping of a heavy, tubular foremast, with artillery direction position.

In September 1917, *Kaiser* was dispatched to the Baltic to join the 'Special Unit' for the conquest of the Baltic Islands. On 24 September, the ship departed Kiel for Putziger Wiek and from there to Libau on 10 October. On 12 October 1917, she bombarded the Russian battery on Cape Hundsort, together with *Prinzregent Luitpold* and *Kaiserin*. On 14 October she hit the Russian destroyer *Grom* at great range with a shell, which rendered both engines unserviceable. Briefly afterwards the Russian destroyer was taken as a prize, but she sank shortly thereafter. On 16 October, *Kaiser* bombarded Cape Toffri. On 31 October, the Special Unit was detached and arrived in Kiel on 2 November 1917, arriving back in the North Sea on 7 November.

On 17–18 November 1917, *Kaiser* and *Kaiserin* were acting as security for minesweepers and II Reconnaissance Group (Aufklärung Gruppe; AG), with the senior officer aboard *Kaiserin*. A battle developed between II AG and superior British forces and the two battleships intervened, hitting a British light cruiser. However, lack of resolve by the senior officer meant the chance of a greater success was missed.

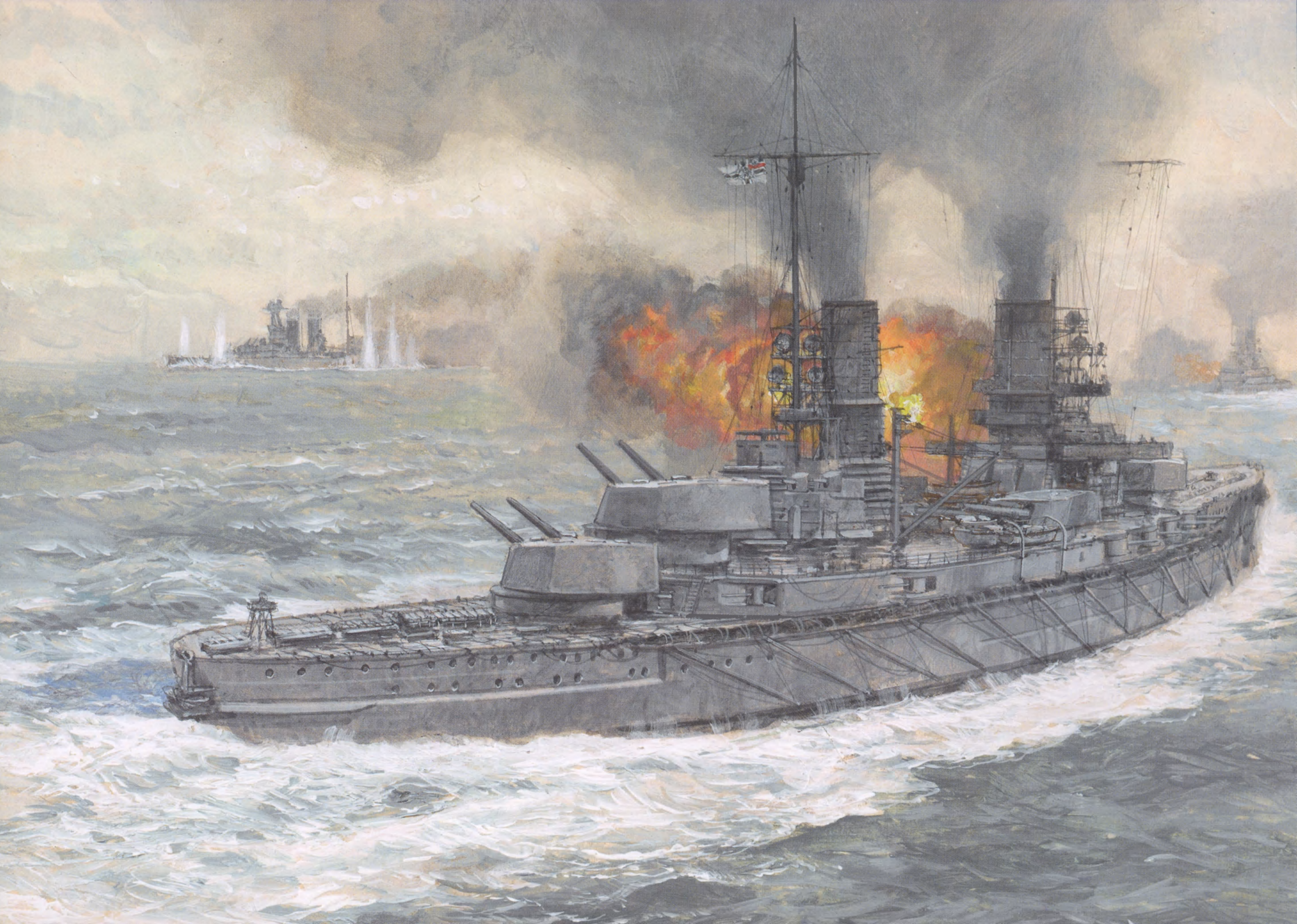
On 2 February 1918, the small cruiser *Stralsund* struck a mine and *Kaiser* was one of the ships ordered to escort her in. *Kaiser* took part in the Fleet advance of 23/25 April without special events. The ship was ready for the aborted fleet advance of 30 October 1918.

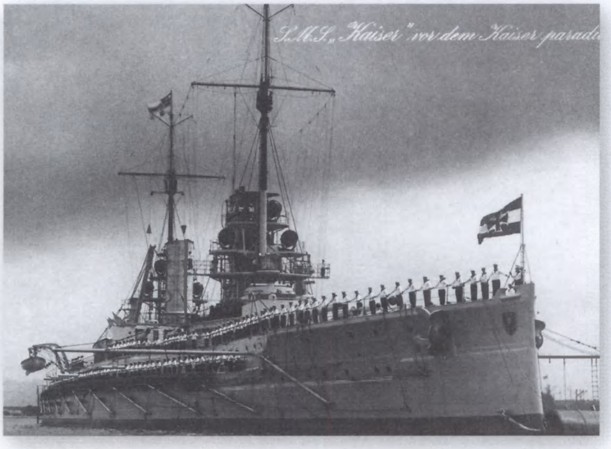
Kaiser belonged to the unit of interned ships and departed Wilhelmshaven on 19 November. On 21 June 1919, she was scuttled by her own crew.

B

SMS *KAISER* IN THE SKAGERRAK BATTLE (JUTLAND)

Of the four ships of the *Kaiser* class that participated in the Skagerrak battle, only *Kaiser* was hit, and only once. Compared to this level of damage, they inflicted considerable punishment on their opponents. Most of the German battleship fire was on targets of opportunity as they presented from the haze, and not ship against ship, and therefore several battleships were generally firing on the same target at the same time. This type of group fire made spotting the fall of shot difficult, and therefore made accurate fire control and correction problematic. Nevertheless, between 1920 and 1945hrs, with no less than five German battleships firing, and at one time seven battleships engaging, HMS *Warspite* received up to 20 shell hits of all calibres, including nine heavy-calibre hits. Much damage was done, including holing underwater that caused flooding and reduced speed to 16 knots. Therefore, the commander of V Battle Squadron ordered *Warspite* to retire, her damage precluding her from taking further part in the battle. When the German battleships could see well enough to shoot, their fire was very accurate, and capable of knocking their opponents out of the battle. Our battle scene shows *Kaiser* firing full salvos against *Warspite*.





SMS *Kaiser* dressed for a fleet review in Kiel in 1913.

Friedrich der Große

The keel for the new battleship *Ersatz Heimdall* was struck in the Vulcan Dockyard in Hamburg on 26 January 1910. She was to be the new fleet flagship. Launching followed on 10 June 1911. After dockyard trials and being transferred to Wilhelmshaven, *Friedrich der Große* was placed into service on 15 October 1912. Following the usual exercises in the North Sea and Baltic she went to the Imperial Dockyard in Kiel for final fitting-out work. On 22 January 1913 *Friedrich der Große* was released from trials and on 2 March 1913 began service as fleet flagship, a service that was last until March 1917.

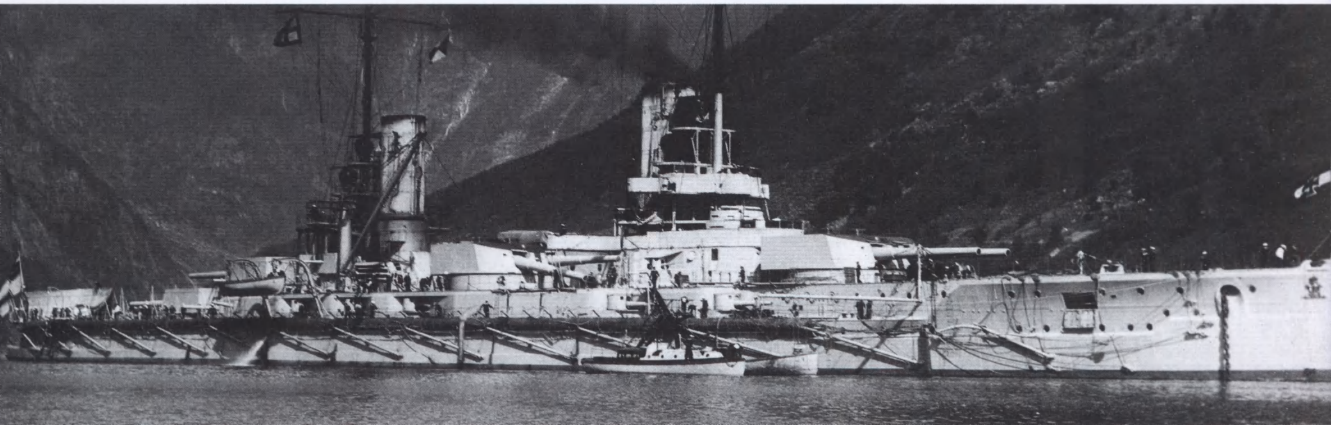
In February 1913, the High Sea Fleet conducted exercises in the Kattegat and North Sea. On 12 March there were further exercises, which ran until 14 March. In April 1913 *Friedrich der Große* went into dock, but at the end of the month there were artillery exercises in the Baltic, followed by fleet exercises in the North Sea from 5 to 27 May 1913. In June the ship went to Kiel for Kiel Week. During the second half of July and first half of August, the fleet undertook a summer cruise to Norwegian waters, and *Friedrich der Große* lay off Balholmen.

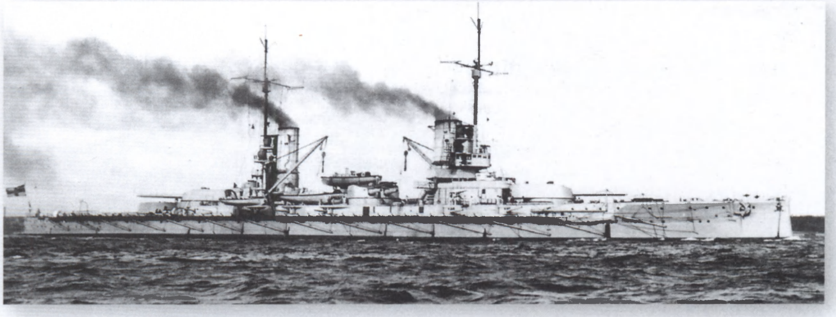
On 31 August 1913, the autumn manoeuvres began off Helgoland and concluded on 9 September. Individual ship and unit training followed in October and November.

The year 1914 began with individual ship and unit training. At the end of March, spring manoeuvres took pace in the North Sea, followed by fleet manoeuvres in the Baltic and North Sea in April and May, whereby in April *Friedrich der Große* tactically formed part of III Squadron. Kiel Week followed in June. Preparations then began for the summer cruise, even though there was tremendous tension in the air after the murder of Archduke Franz Ferdinand on 28 June 1914.

On 13 July the last peacetime cruise of the Imperial Navy began and after a rendezvous between the North Sea and Baltic forces, exercises took place in the area of Skagen. On 25 July the ships ran into Norwegian fjords, but on the evening of 26 July they began the homeward journey because of the Austrian ultimatum to Serbia. Then on 27 July the entire High Sea Fleet rendezvoused off Cape Skadenes. The ships returned to their home ports, but remained at a state of increased readiness, not because of Britain, which the Germans believed would remain neutral, but because they feared a surprise attack by Russian torpedo boats.

SMS *Friedrich der Große*, the High Sea Fleet flagship, lying in Balholmen, Norway, in July 1913.





Friedrich der Große underway. The admiral's bridge is conspicuous, as are the extensions on the yards for the increased number of signal flag lines.

Friedrich der Große took part in the fleet advance of 2–3 November 1914 and the following advance on 15–16 December 1914. On this occasion Admiral von Ingenohl quit his support position prematurely and therefore missed an opportunity to conduct a sea battle under very favourable conditions. On 3 February 1915, Admiral Pohl hoisted his flag on *Friedrich der Große* as the new fleet chief. The following fleet advances were made under his direction in 1915.

- 29–30 March: an advance to the north of Terschelling
- 17–18 April: an advance to cover a mining operation by II AG
- 21–22 April: a fruitless advance into the North Sea, in the direction of Doggerbank
- 17–18 May: an advance to cover mine-laying operation by II AG
- 29–30 May: a fleet advance to 50 nautical miles off Schiermonnikoog, which, however, was broken off in poor weather
- 10 August: an advance to the north of Helgoland to cover the return of the missing auxiliary cruiser *Meteor*
- 11–12 September: an advance to cover mine-laying off the Swarte Bank
- 23–24 October: a fleet advance to Horns Reef

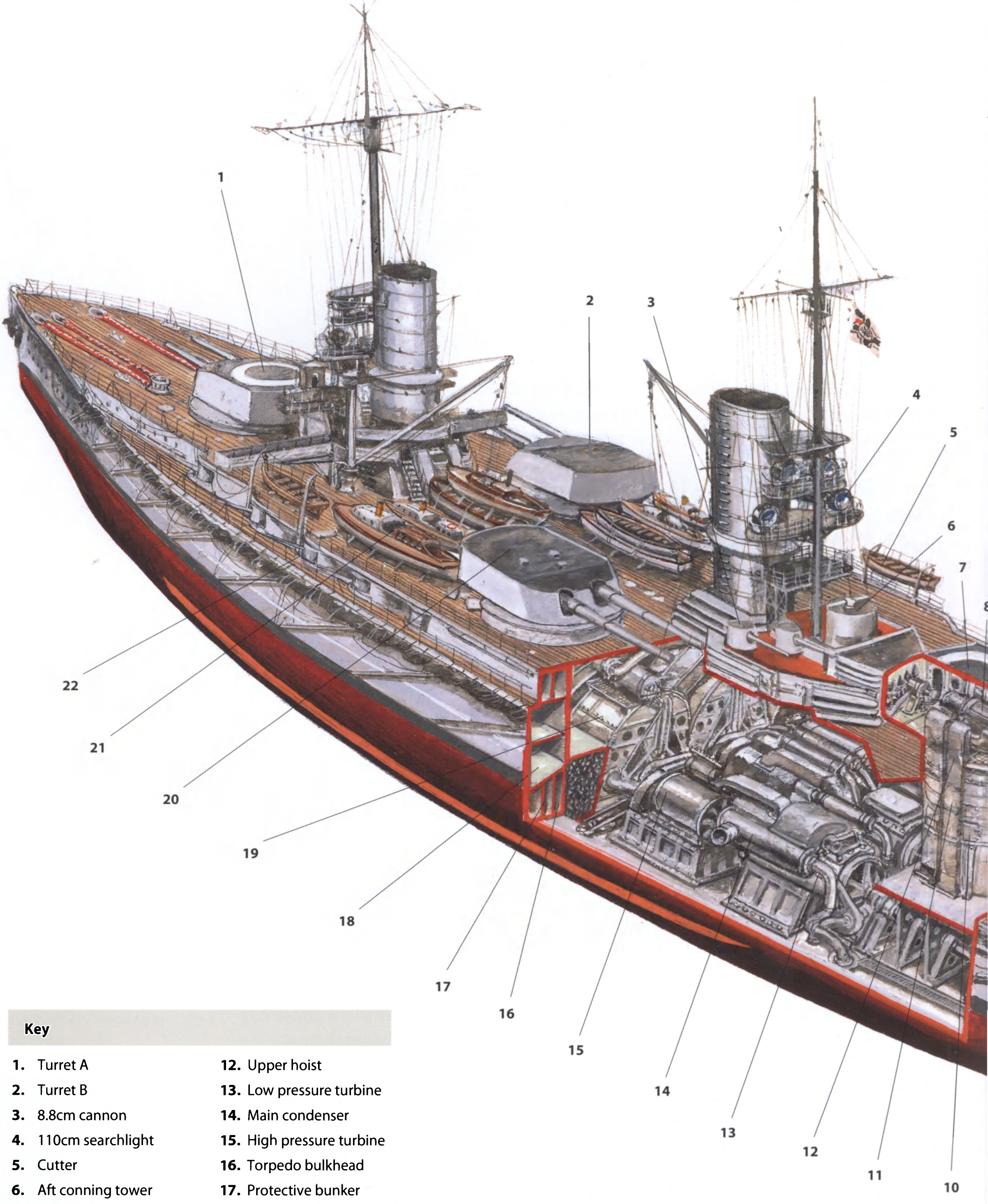
On 11 January 1916, Vizeadmiral Scheer took over as fleet chief, and on 18 January set his flag on *Friedrich der Große*. After exercises off Helgoland on 17 January a fleet advance took place on 5–7 March, under the new leader aboard *Friedrich der Große*. On 25–26 March there was a fleet advance to attack British forces that had supported the aircraft attack on Tondern; there was no contact, however. An advance to Horns Reef followed on 21–22 April.

The next advance was on 24–25 April 1916 to support the reconnaissance forces bombarding the English coast at Lowestoft and Great Yarmouth. The intended operation for the end of May, an operation to bombard Sunderland, could not be carried out because the weather was unfavourable for airship reconnaissance, and therefore a substitute undertaking to the north to disrupt merchant traffic was carried out. This resulted in the Skagerrak battle. During the battle, *Friedrich der Große* took *Warspite* under fire as she circled out of control, and later during the night action she opened fire on the armoured cruiser *Black Prince*. *Friedrich der Große* suffered no hits or damage.

The Sunderland plan was reactivated for the fleet advance of 18–19 August 1916, but an erroneous report from an airship caused the newly promoted Admiral Scheer to turn after a phantom enemy unit before the bombardment could be carried out. At the end of the day, there was no enemy contact. A further fleet advance followed on 18–19 October 1916.

On 1 December 1916, the High Sea Fleet was reorganized, although *Friedrich der Große* remained fleet flagship until spring 1917, when the new flagship, *Baden*, was ready for service. On 14 March, Admiral Scheer lowered his flag and *Friedrich der Große* joined IV Squadron.

On 4–5 July 1916 a revolutionary agent provocateur incited the crew to refuse work over a food shortage. Through the quick production of soup,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Key

1. Turret A
2. Turret B
3. 8.8cm cannon
4. 110cm searchlight
5. Cutter
6. Aft conning tower
7. Turret C
8. 30.5cm cannon
9. Turret D
10. Lower hoist
11. Working chamber
12. Upper hoist
13. Low pressure turbine
14. Main condenser
15. High pressure turbine
16. Torpedo bulkhead
17. Protective bunker
18. Upper bunker
19. Boiler
20. Turret E
21. Steam pinnace
22. 15cm cannon

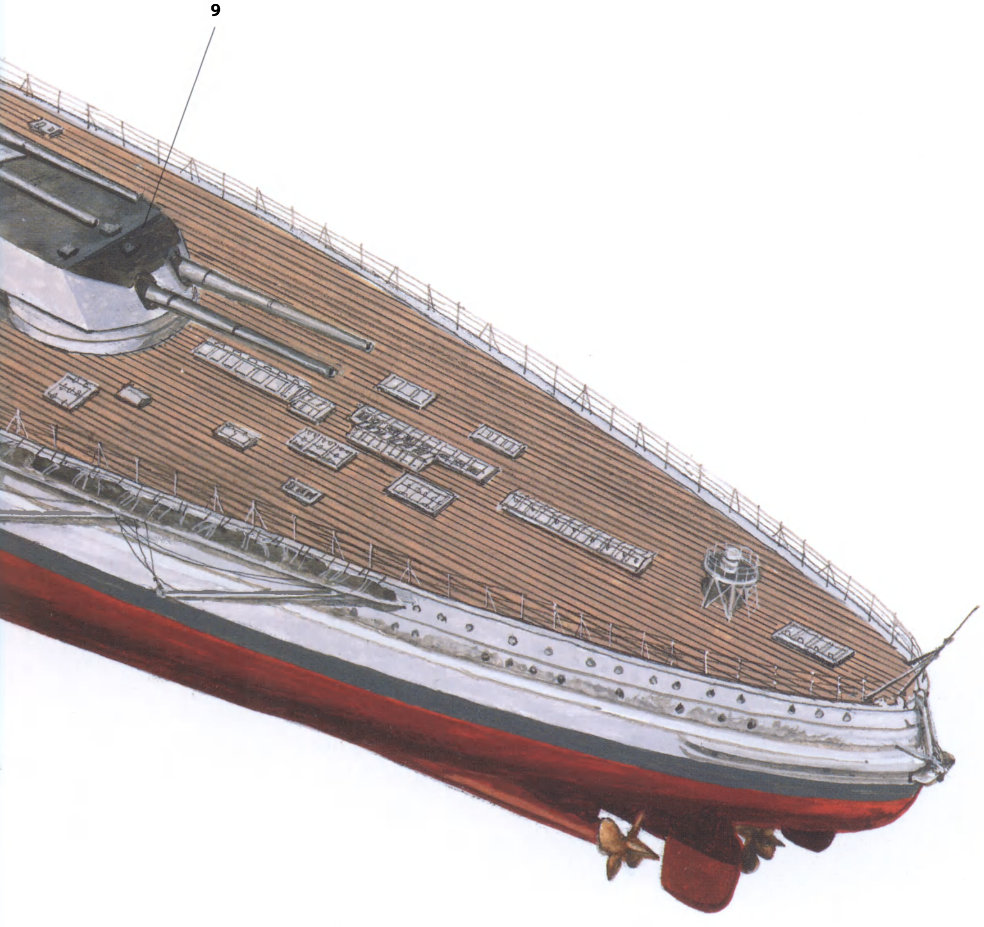
C SMS *FRIEDRICH DER GROßE* (1917)

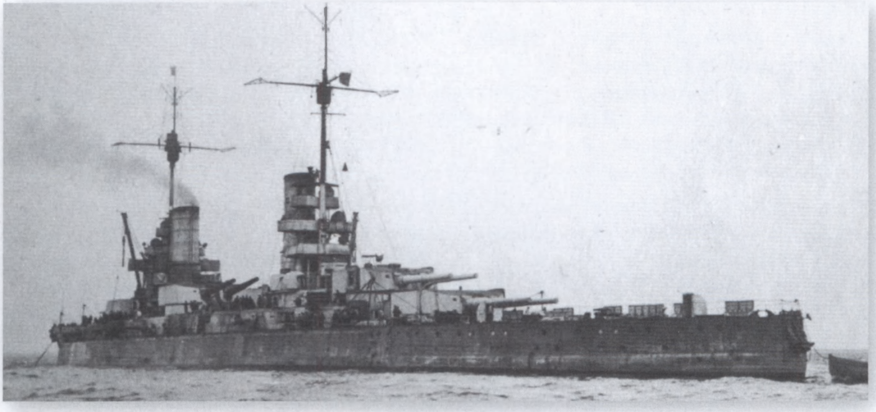
The battleship *Friedrich der Große* was built as a unit of the *Kaiser* class, the third generation of German dreadnought battleships. The ships of this class were very heavily armoured with nickel-chrome and Krupp cemented steel armour that weighed 9,855 tonnes, or 40.5 per cent of the normal displacement. As can be seen from the cutaway drawing, there was a bow torpedo room and two broadside torpedo rooms, the bow broadside room being particularly large. This configuration reflected the German admiralty's thinking, still prevalent at the time of their design, that the battles of the future would be decided at medium to short range, where the torpedo would be an effective weapon.

The en-echelon turret grouping meant that the boiler rooms were divided into a forward and aft group, but this had no effect on steam output and *Kaiser* was the fastest German dreadnought at the time, with a speed of 23.4 knots on trials. The new turbine machinery fitted for the first time to the *Kaiser* class was also very reliable. In December 1913, *Kaiser* and *König Albert* of this class departed for an extended cruise to West Africa and South America. After rounding Cape Horn they visited Valparaiso in Chile in April 1914, before returning to Germany. This deployment proved that the German battleships were perfectly capable of worldwide employment, and they traversed some of the stormiest seas in the world.

Much of the Zwischendeck, or 'tween deck', is taken up with crew accommodation. It has sometimes been said that German battleships had cramped living quarters, or were not designed to be lived on. Such views are untrue, and if the cruise to South America was not enough to disprove this mistaken idea, the facts are that the battleship *König* had more space per man than the contemporary British *Emperor of India*, the German ship having 2.12 square metres per head compared to 2.04 square metres on the English ship. However, *König* did have slightly less space for the admiral and commander.

The heavily armoured turrets were positioned with the midship turrets en-echelon, and could be deployed to give a ten-gun broadside equally to port or starboard. The heavy tubular foremast was fitted with an artillery direction position, which would have been a great asset during the Skagerrak battle, when for much of the time the German battleships were unable to make effective reply to the British fire because of their poor visibility from sea level.



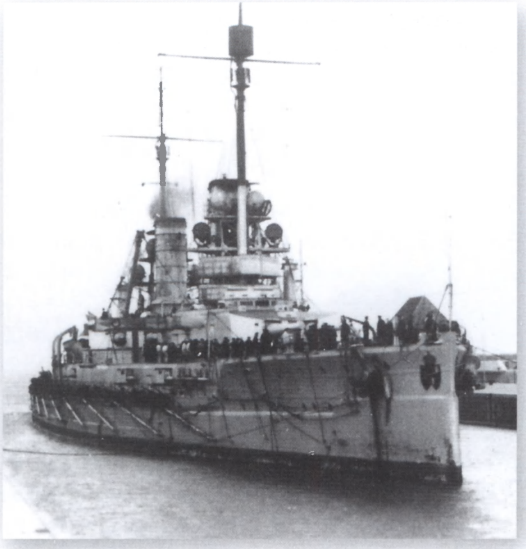


Friedrich der Große anchored on Wilhelmshaven Roads during the war. The covers over the barrels of E turret and tarpaulins over the adjacent casemate are to protect these areas from dust during coaling operations.

order was restored, but further disobedience followed on 11 July and the ringleaders were arrested and put on trial. From *Friedrich der Große* an Oberheizer (Leading Stoker) was sentenced to death and was executed in Cologne on 5 September 1917. Several others had their sentences commuted.

In October 1917, *Friedrich der Große* took part in the conquest of the Baltic Islands and conducted several coastal bombardments. On 27 October she was detached to the North Sea and resumed picket and security duty there. In 1918 she sailed in the advance to Norway on 23–25 April. A long dockyard period followed from 26 July to 28 September 1918, but the battleship was ready for the aborted fleet advance on 30 October. While there was disobedience on *Thüringen* and *Helgoland* on 29 October, passive resistance only began aboard *Friedrich der Große* on 30 October. On 31 October, the seamen and stokers went on a 'go slow' during coaling, but this was nevertheless completed on 1 November 1918.

Under the terms of the Armistice, Germany had to allow part of the Imperial Navy to be interned in a neutral port. The late former head of the Bundesmarine, and World War I and II veteran, Vizeadmiral Friedrich Ruge a.D., once confided to the author that Norway freely advised the Allies that she was willing to host the German ships. However, this information was not acted upon and Britain insisted that the German ships be interned in Scapa Flow, in contradiction to the terms of the Armistice. *Friedrich der Große* was one of the ships to be interned, and because the Allies forgot to include *Baden* she served as Konteradmiral von Reuter's flagship until he transferred to *Emden* on 25 March 1919. She was one of the first ships to sink when the order to scuttle was given on 21 June 1919.



After the fleet manoeuvres in July 1914, *Kaiserin* detached and went to Brunsbüttel where, as seen here, she was the first large warship to navigate the newly widened and deepened canal, on 25 July 1914.

Kaiserin

The construction of the third of the *Kaiser* class was begun by Howaldtswerke in Kiel in July 1910. Witnessed by her parents, the Imperial daughter, Prinzessin Victoria Louise von Preußen, christened the ship before her launch on 11 November 1911. Dockyard delivery followed on 13 May 1913, and *Kaiserin* was commissioned on 14 May 1913. Dockyard trials followed, which were interrupted by turbine damage, so that *Kaiserin* only concluded trials on 13 December 1913 and could then join III Squadron.

The usual unit and individual training followed in 1914 and in February there was squadron and fleet training in the North Sea. In May there were manoeuvres in the North Sea and Baltic. On 7 July, *Kaiserin* went on the Norwegian cruise with the fleet. When the cruise was broken off and they were ordered home on 22 July,

The battleship *Kaiserin* at anchor on Wilhelmshaven Roads during the war.

Kaiserin went to Brunsbüttel, to be the first dreadnought to test the newly deepened Kaiser Wilhelm Canal. *Kaiserin* arrived in Brunsbüttel on 24 July and after a little lightening entered the canal at 0500hrs on 25 July 1914. The journey went well and at around 1630hrs the locks at Holtenau, in Kiel, were passed. The ship rejoined III Squadron and on 31 July they passed through the canal to return to the North Sea.

During the remainder of 1914, *Kaiserin* took part in the fleet advances on 2–3 November and 15–16 December. From 23 to 29 January 1915, Kaiserin was in the Baltic with her squadron for training. Next she went to the Imperial Dockyard, Wilhelmshaven, for overhaul work from 31 January to 20 February 1915. *Kaiserin* then participated in the fleet advances on 17–18 May, 29–30 May, 10 August, 11–12 September and 23–24 October 1915. She finished the year with unit training in the Baltic from 5 to 20 December 1915.

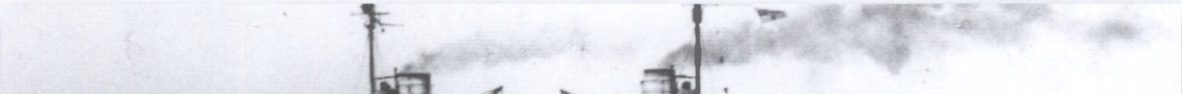
In 1916, *Kaiserin* took part in the advances on 5–6 March, on 2–3 April to Amrum Bank, 21–22 April to the west and then on 31 May to 1 June was involved in the Skagerrak battle. *Kaiserin* carried out these operations without damage or personnel loss, while she had contributed to inflicting serious damage on the English battleship *Warspite*.

After unit training in the Baltic in August, the ship took part in the fleet advance on 18–19 August. Baltic training followed from 21 October to 2 November 1916. On the return journey, the squadron went to the assistance of the stranded U-20 and U-30.

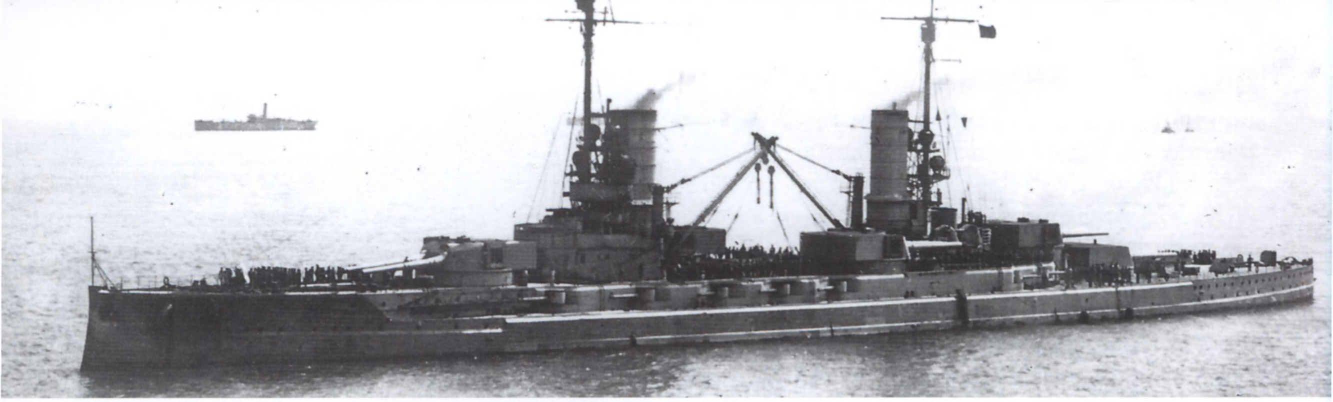
With the reorganization of the squadron on 1 December 1916, due to the retirement of the older ships, *Kaiserin* was transferred to the new IV Squadron. The squadron chief was Vizeadmiral Mauvre.

On a journey through the Kaiser Wilhelm Canal on 14 March 1917, to training in the Baltic, *Kaiserin* stuck fast and damaged a bilge keel. A total of 280 tonnes of water flooded into the ship and she was under repair in the Imperial Dockyard, Kiel, from 15 March to 18 March 1917. After missions to the North Sea from 30 March to 8 June, a training period in the Baltic followed from 9 June to 2 July 1917, and then more missions in the German Bight followed from 3 July to 11 September 1917.

In September 1917, *Kaiserin* joined the Special Unit for the conquest of the Baltic Islands, under the leadership of Vizeadmiral Ehrhard Schmidt. On 23 September, the ship quit Kiel and anchored in Putziger Wiek the following day. On 10 October the advance to the Tagga Bay began, where on 12 October



The battleship *Kaiserin* underway. *Kaiserin* often operated with sistership *Kaiser*, and the pair were then referred to as 'the married couple'.



Kaiserin on Wilhelmshaven Roads. The position of the sun highlights the very thick belt and citadel armour. The picture comes from later in the war, after the torpedo nets had been removed.

the Special Unit arrived and *Kaiserin* began bombarding the Russian battery at Cape Hundsort. During 14–15 October the bombardment of the Zerel battery followed. On 16 October, *Kaiserin* began the return journey to Kiel via Danzig, and then returned immediately to the North Sea.

The II AG, consisting of *Königsberg*, *Nürnberg*, *Frankfurt* and *Pillau*, undertook an operation on 17 November 1917 to support minesweepers far out in the North Sea. The covering unit consisted of *Kaiser* and *Kaiserin.* A force of British battlecruisers attacked II AG and the German battleships intervened, whereby *Kaiserin* obtained a hit on the British cruiser *Caledon.* Yet the British managed to escape, and as senior officer the commander of *Kaiserin* took responsibility and was sacked because of his poor handling of the situation.

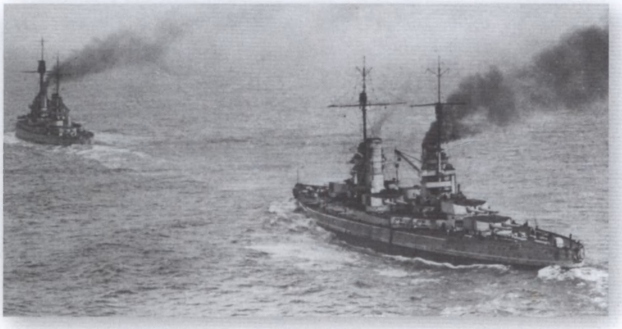
From 22 December 1917 to 5 February 1918 *Kaiserin* was in Kiel Dockyard. After returning to the North Sea an advance to the north followed on 24–25 April, which, however, was prematurely broken off because of engine damage to *Moltke*. Further picket service in the German Bight was only interrupted by exercises in the Baltic from 18 June to 13 August 1918 and at the beginning of September a brief dockyard period in Wilhelmshaven. After a short training operation in the Baltic from 22 to 28 October *Kaiserin* stood ready for the planned advance at the end of October, which was not undertaken.

Under the terms of the Armistice *Kaiserin* was interned in Scapa Flow, where on 21 June 1919 she was scuttled by her own crew.

König Albert

Although laid down before *Prinzregent Luitpold*, the *Ersatz Aegir/König Albert* was the last of her class to be launched, on 27 April 1912. Commissioning followed on 31 July 1913. To test the turbine plant reliability and performance, the special Detached Division was formed from the ships *Kaiser*, *König Albert* and the cruiser *Straßburg*, under the command of Konteradmiral von Rebeur-Paschwitz. The unit undertook a cruise to South America via West Africa, departing Wilhelmshaven on 9 December 1913 and returning to Kiel on 17 June 1914. The turbines performed flawlessly, even under harsh

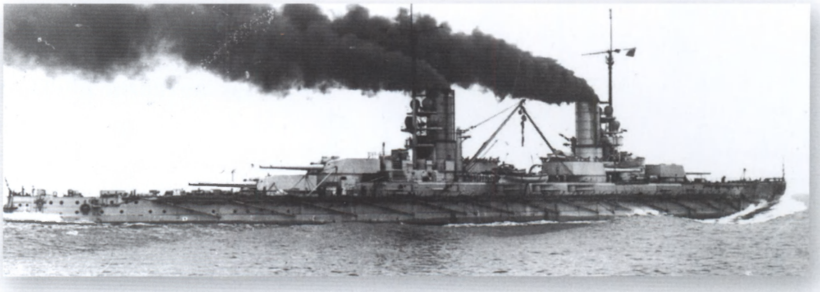
BELOW LEFT
Kaiserin follows in the wake of IV Squadron comrade *Friedrich der Große* late in the war.



BELOW RIGHT
Kaiserin coaling in Wilhelmshaven in April 1918. Coaling was particularly dirty and arduous work, even when in port.

climatic conditions. After the return, *König Albert* joined III Squadron.

In the first year of the war, *König Albert* took part in the fleet advances on 2–4 November 1914 and 15–16 December 1914 to support I AG with the bombardments of the English coast. During 1915 *König Albert* undertook the fleet advances into the North Sea and on 15 May at around 2200hrs had to uncouple the starboard turbine because of a loose bushing. The two remaining turbines were sufficient, however, to propel the ship at 18 knots.



The battleship *König Albert* running trials in the second half of 1913, prior to the departure for West African and South American waters on 9 December.

In 1916, *König Albert* again took part in the fleet advances in March and April, but because of the need to replace tubing in the three main condensers missed the Skagerrak battle, and lay in the Imperial Dockyard, Wilhelmshaven, from 29 May to 15 June 1916. She participated in the advance into the North Sea on 19–20 October 1916. After unit training in the Baltic, *König Albert* was part of the support group for the stranded U-boats U-20 and U-30 on 4 November 1916. With effect from 1 December 1916, she became part of the newly formed IV Battle Squadron.

The first half of 1917 passed quietly and from 18 August to 23 September 1917 *König Albert* lay in the Imperial Dockyard in Kiel. Only in September was she active as part of the Special Unit for Operation *Albion* against the Baltic Islands. In this operation, she first went to Putziger Wiek and from there departed to the north on 10 October 1917. On 12 October, together with *Friedrich der Große*, she bombarded the Sworbe Peninsula, and on 15–16 October 1917 shelled the Zerel Battery. Also on 16 October, she departed to replenish coal stocks in Putziger Wiek and on 18 October returned to Tagga Bay on Ösel Island. However, while there she was dismissed from the Special Unit and returned to Kiel via Putziger Wiek, arriving on 23 October 1917.

On 2–3 November 1917, *König Albert* served as a flagship for a force covering minesweepers in the German Bight. Other partaking ships were *Derfflinger*, *Nassau*, *Rheinland* and *Kaiserin*.

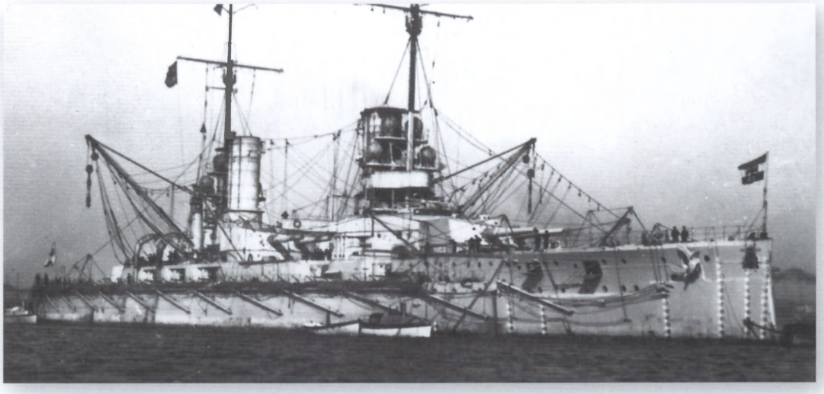
During 1918, *König Albert* undertook the normal picket and guard duty in the German Bight and stood ready for the planned fleet advance on 30 October 1918. The advance was abandoned, however, because of the refusal of some crews to perform their duties. After this episode, she lay again on picket duty with IV Squadron until 10 November 1918. On this day she ran into Wilhelmshaven and the red flag of mutiny was hoisted.

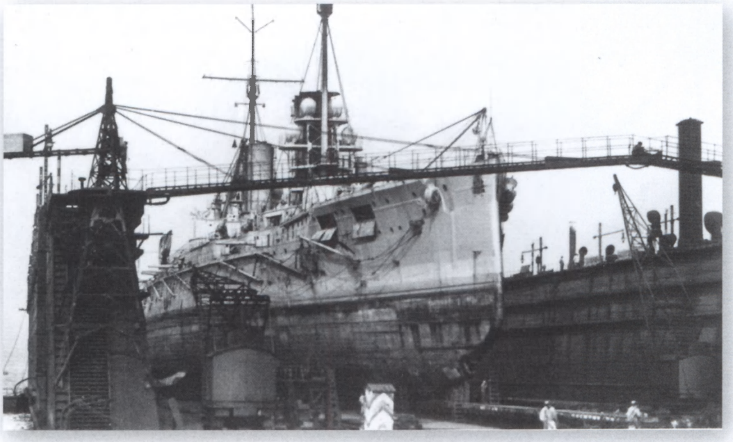
König Albert belonged to the unit of interned ships and was scuttled in Scapa Flow on 21 June 1919.

Prinzregent Luitpold

In 1910 the Germania Dockyard in Kiel began construction of *Ersatz Odin*, which became the *Prinzregent Luitpold*. On 17 February

König Albert coaling in Kiel during trials.





The battleship *König Albert* in the large floating dock in Kiel. Germany made extensive use of large floating docks.

1912, the ship was launched. It was originally intended that the new battleship be propelled by a diesel engine on the centre shaft; however, the new engine was not ready so that on 14 June 1913, the RMA took over the ship without a diesel and commissioned her on 19 August 1913. With the two sets of turbines installed, *Prinzregent Luitpold* was only slightly slower than her sisterships, with a highest achieved speed during trials, which were concluded by the beginning of November, of 21.7 knots.

Prinzregent Luitpold was completed with provisions for a staff and became flagship of III Squadron after she was commissioned. Up until the beginning of the war, the battleship participated in individual training as well as all the exercises of the fleet. Similarly, after the outbreak of the World War I, she was involved in all the operations of the fleet and III Squadron during 1914 and 1915, but was replaced as squadron flagship by *König* when Vizeadmiral Scheer transferred his flag to her on 24 January 1915. On 24 April 1915, she ran aground in the Kaiser Wilhelm Canal, but came free without serious damage.

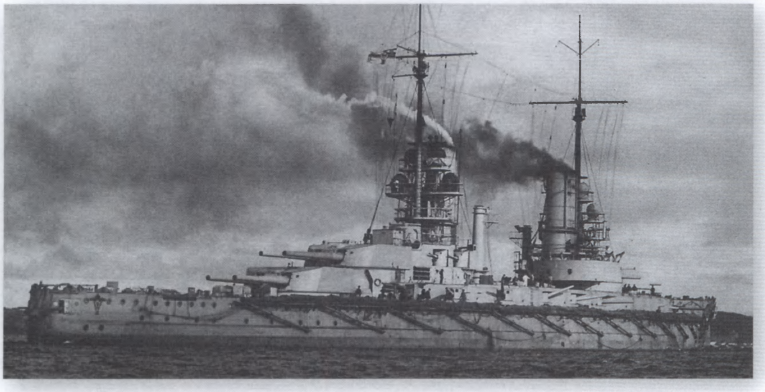
During 1916, *Prinzregent Luitpold* took part in the springtime operations and participated in the Skagerrak battle on 31 May. During this battle she engaged the British battleships and cruisers, but was not damaged herself. In August she took part in the operation of 18–19 August towards the English coast, and enshipped the Leader of U-Boats for this operation. *Prinzregent Luitpold* also took part in the advance to the Doggerbank on 18–20 October 1916.

On 1 December 1916, *Prinzregent Luitpold* became flagship of the newly formed IV Squadron. On 20 January 1917, the ship ran over a steel hawser on Wilhelmshaven Roads, which became entangled in the starboard propeller shaft. She was replaced as squadron flagship on 18 March and for the remainder of 1917 and 1918 her activity consisted mainly of security and picket duty in the German Bight.

During the summer of 1917, there was unrest on many ships of the High Sea Fleet, which in some cases resulted in indiscipline and mutiny. On 6 June and 19 July the stokers aboard *Prinzregent Luitpold* demonstrated against the food provision, but the basis of the agitation was politically motivated. There was a hunger strike and refusal to obey orders. The high point came on 2 August when up to 800 men refused to work. The authorities then stepped in and restored order, and as a result one stoker was executed on 5 September 1917 after repeated offences.

In September 1917, *Prinzregent Luitpold* was assigned to take part in the operation to take the Baltic Islands, and on 12 October 1917 she bombarded the Russian battery

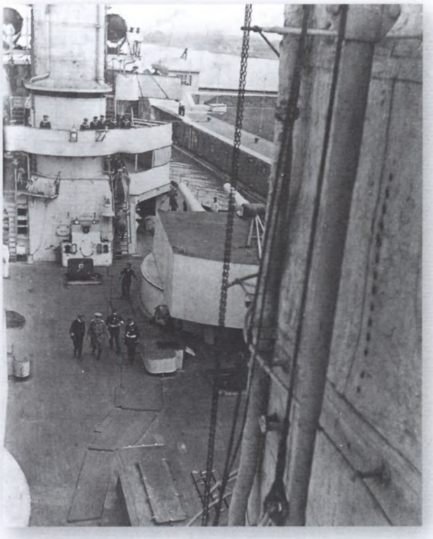
A fine view of the battleship *Prinzregent Luitpold* in Kiel before the war.



at Cape Hundsort. She was detached from the Special Unit on 24 October. A dockyard period followed in Kiel and on 21 December 1917 she returned to Wilhelmshaven to continue picket and guard duty.

On 17 March 1918, *Prinzregent Luitpold* went for exercises in the Baltic Sea. She was rammed the next day by *Derfflinger* in Kiel fjord, but there was little damage. The ship also participated in the fleet advance on 23–25 April 1918, and was ready to join the last fleet operation on 30 October 1918. On 10 November 1918, the red flag of revolution was raised on order from the Sailors' Council.

Prinzregent Luitpold belonged to the unit of interned ships and departed Wilhelmshaven for the last time on 19 November 1918. On 21 June 1919, she was scuttled by her own crew.



Prinzregent Luitpold in the lock at Holtenau, Kiel. The battleship is playing host to army dignitaries. Turret E is visible, along with the aft superstructure, including wireless antenna and ship's bell.

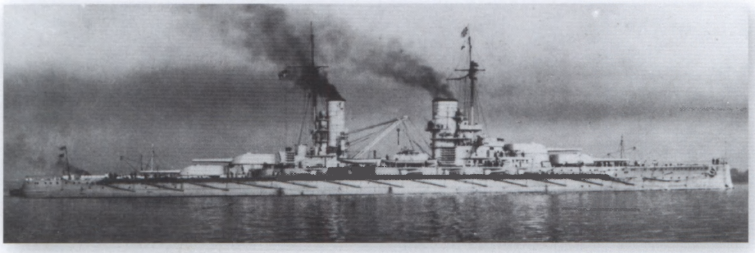
BATTLESHIPS OF THE *KÖNIG* CLASS

The focus of making improvements to the following class, the battleships of 1911 or *König* class, came down to enhancing the armament by increasing the calibre or number of barrels, or by altering the position of the turrets, and also improving the engine plant by the installation of the promising diesel engine on the centre shaft. The implementation of any of these improvements came down to the matter of cost.

At the end of 1909, the first discussions about the new type were held. State Secretary Tirpitz was in favour of retaining the design of the previous ship, *Prinzregent Luitpold*, to avoid delays in building and to remain within the budgetary framework. The head of the General Navy Department wanted to await the conclusion of trials of the first two battleships of the *Nassau* class, and the trial results of the new MAN diesel engines. He was against retention of the previous type and believed the centreline arrangement of the heavy artillery was a natural progression.

A series of meetings followed in May 1910, with the first item for discussion the question of introducing diesel engines. The next meeting discussed the introduction of triple turrets, but this objective, and a proposal to introduce guns of 32cm calibre, failed for no other reason than cost. There were concerns about Britain and the United States increasing their calibre to 13.5 and 14in (34 and 35.6cm respectively), and the ballistic qualities of the German 32cm piece were similar to these weapons. The State Secretary, however, still clung to view that a long-range running battle was unlikely and that decision would come from a mêlée situation. His view was based more on financial considerations rather than reality, and Tirpitz wanted to postpone the calibre question until 1912. He was also against changing to a centerline arrangement for the turrets, and brought up various reasons against this option, such as causing delays in building and the fact that superfiring turrets might not be able to fire directly over one another. In fact, the later British *Queen Elizabeth* battleships could never fire directly over the end turrets because of blast pressure, so in one way Tirpitz had a point. He further pointed out that an increase in calibre

A view over turret A as *Prinzregent Luitpold* ploughs into a swell.



The very light grey colour of German warships is evident in this view of SMS *König*, taken early in the war just after commissioning.

would come at the expense of number of barrels, because of cost and weight restrictions. At the end of May the centreline problem was postponed without result.

Meanwhile, Oberbaurat Veith, the head designer of the Department of Engine Construction, advised that the large diesel engine were still not ready for employment, but Tirpitz remained steadfast. However, he began to waiver on the centerline arrangement. When Kapitän zur See von Trotha voiced his support of the centreline position for the artillery, Tirpitz was finally convinced, and gave instructions to draw up a modified design. He also indicated that the cost of any new improvements would have to be paid for from the budget 'pool' of accumulated funds. Budget constraints had hindered the development of the *Kaiser* class two years previously, and now they were holding back the development of the *König* class.

At the same time, a circular argument revolved around the installation of Frahm anti-roll tanks. As completed, the *Nassau* class had a high metacentric height, which gave them good stability, but a short, sharp roll period. This resulted in an unstable platform, and bilge keels had to be fitted to solve this roll problem. Therefore it was proposed to install Frahm anti-roll tanks in the *König* class, as were being fitted in the large cruiser *Derfflinger*. The installation of the active roll damping system, however, would increase weight by 500 tonnes, would cost more and in the case of *König* would require the omission of two boilers to create space for the system. Installing bilge keels would reduce the speed by half a knot, but the deletion of two boilers achieved the same result. This impasse was not immediately resolved.

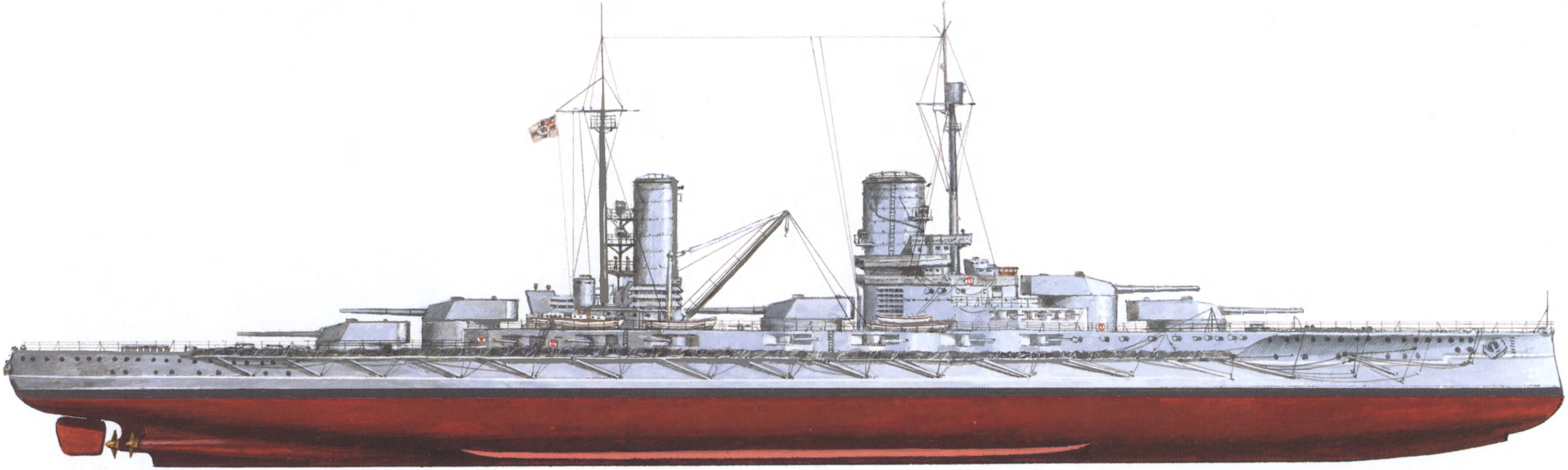
D

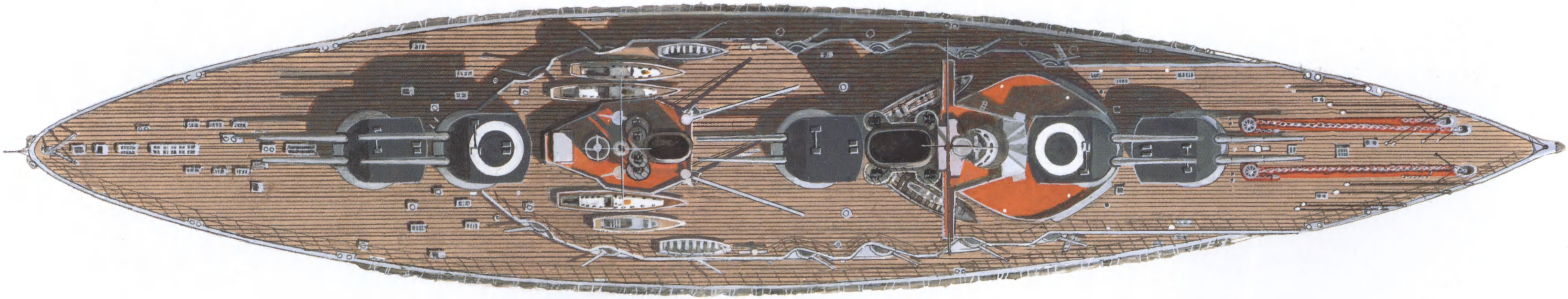
KÖNIG CLASS

Apart from the German battlecruisers, the battleships of the *König* class were tested in battle more than any other class of ships of any nation during the war. Conceived as an improvement of the *Kaiser* class, the principal difference was that the *König* class had all five 30.5cm turrets mounted along the centreline, with superfiring groups forward and aft. The armoured protection remained essentially the same.

During the Skagerrak battle, *König* led the High Sea Fleet battleline and consequently was taken under heavy artillery fire, as was the leading battlecruiser, *Lützow*. *König* was hit by ten heavy- and six medium-calibre shells, *Großer Kurfürst* was struck by eight heavy shells and *Markgraf* was hit by heavy artillery five times. *Kronprinz* alone remained undamaged. The heavy belt armour kept many shells out, while the citadel armour lessened the effectiveness of many other hits, and kept the medium-calibre shells out. For a period during the battle, the ships of the *König* class, and others, battled the 15in-gunned British battleships of V Battle Squadron, forcing *Warspite* to retire from the action, while they themselves held the line. After being repaired, the German III Squadron battleships were at sea to cover the recovery of the U-boats U-20 and U-30 on 5 November 1916, when *Großer Kurfürst* and *Kronprinz* were both torpedoed by the submarine J1 off Denmark. Neither ship was badly damaged and both could hold their speed. Then on 5 March 1917, *Großer Kurfürst* rammed *Kronprinz* during evolutions near Helgoland, and *Kronprinz* shipped 650 tonnes of water, and another 650 tonnes of counter flooding.

During the conquest of the Baltic Islands, *Großer Kurfürst* struck a mine on 12 October 1917. The damage was inside the area protected by the torpedo bulkhead and just 280 tonnes of water flooded into the ship. A short time later, on 29 October, *Markgraf* struck two mines in quick succession on the starboard side. Once again, the hits lay within the area of the torpedo bulkhead and only 260 tonnes of water were shipped. Therefore it could be said that the *König* class was seriously tested by shellfire, torpedo and mines and resoundly proved its steadfastness.





In the end, the *König* class were constructed with all guns on the centreline, each gun with a calibre of 30.5cm, and without Frahm anti-roll tanks and without a diesel motor. Cost had played a crucial role but some improvements were inevitable. The *König* class were the most successful and battle-proven of all German battleships.

Armament

The heavy-calibre armament of the *König* class remained the same as the *Kaiser* class: 10 x 30.5cm SK L/50 C/08 cannon, but set in Drh.L C/11 mountings. This mounting allowed a range of 187hm, but after modification in 1916 the maximum range was increased to 204hm. Nevertheless, in the battle in Moon Sound on 17 October 1917 *König* found herself outranged by the 12in pieces

	König	***Großer Kurfürst***	***Markgraf***	***Kronprinz***
Building dockyard	Imperial, Wilhelmshaven	A.G. Vulcan, Hamburg	A.G. Weser, Bremen	Germania, Kiel
Budget name	'S'	*Ersatz Kurfürst Friedrich Wilhelm*	*Ersatz Weissenburg*	*Ersatz Brandenburg*
Building number	33	4	186	182
Keel laying	3 October 1911	3 October 1911	November 1911	July 1912
Launch	1 March 1913	5 May 1913	4 June 1913	21 February 1914
Commissioned	9 August 1914	30 July 1914	1 October 1914	8 November 1914
Displacement (tonnes)	Designed: 25,796 Loaded: 28,600	Designed: 25,796 Loaded: 28,600	Designed: 25,796 Loaded: 28,600	Designed: 25,796 Loaded: 28,600
Length (metres)	175.4	175.4	175.4	175.4
Beam (metres)	29.5	29.5	29.5	29.5
Draught (metres)	9.0	9.0	9.0	9.0
Moulded depth (metres)	14.4	14.4	14.4	14.4
Engine Plant	3 sets of Parsons turbines	3 sets of A.G. Vulcan turbines	3 sets of Bergmann turbines	3 sets of Parsons turbines
Performance (shaft horsepower)	Designed: 31,000 Maximum: 43,300	Designed: 31,000 Maximum: 45,100	Designed: 31,000 Maximum: 41,400	Designed: 31,000 Maximum: 46,200
Revolutions per minute	251	254	251	256
Speed (knots)	21.0	21.2	21.0	21.3
Fuel (tonnes)*	Construction: 850 Maximum: 3,000 Oil: 150/600	Construction: 850 Maximum: 3,000 Oil: 150/600	Construction: 850 Maximum: 3,000 Oil: 150/600	Construction: 850 Maximum: 3,000 Oil: 150/600
Range (nautical miles)	8,000 at 12 knots 4,000 at 18 knots	8,000 at 12 knots 4,000 at 18 knots	8,000 at 12 knots 4,000 at 18 knots	8,000 at 12 knots 4,000 at 18 knots
Cost (millions of gold marks)	45	45	45	45
Compartments	18	18	18	18
Double bottom (as percentage of length)	88	88	88	88
Crew	41 officers, 1,095 men As a flagship, another 14 officers and 68 men	41 officers 1,095 men	41 officers 1,095 men	41 officers 1,095 men

*Coal, unless otherwise indicated

of the Russian pre-dreadnought battleship *Slava*. A total of 900 shots were carried. In other respects, the shells and munitions were the same as for the ships of the *Kaiser* class. Just as with the *Kaiser* class, the munition chambers were located on the lower platform deck, and the shell rooms were located above them on the upper platform deck.

A very good aerial view of SMS *Markgraf*. The turrets are trained on various bearings to prevent surprise attack. The turrets of this class had a very good training arc.

The medium-calibre armament consisted of 14 x 15cm SK L/45 MPL C/1906.11. As installed they were ranged to 135hm, but after 1915 this was increased to 168hm. The ammunition outfit was 2,240 shots. These cannon were the same as those fitted to the *Kaiser* class in all respects.

As completed, the light artillery consisted of 6 x 8.8cm MPL C/02 cannon. These cannon were mounted in the forward superstructure just below the bridge. The 9kg high-explosive shells could be ranged to 117.9hm. In addition, four *Ballon-Abwehr-Kanone* (Balloon Defence Cannon; BAK) of 8.8cm calibre were mounted on the aft superstructure. These guns were the excellent 8.8cm SK L/45 C/13 Flak model; a total of 2,500 rounds of 8.8cm munition were carried.

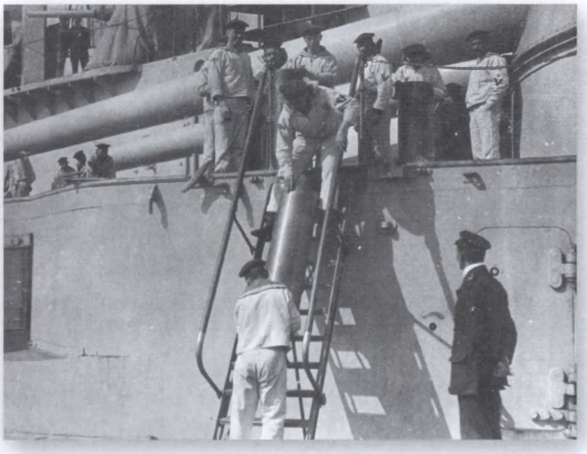
The ships also mounted five torpedo tubes. Four were on the broadside, and one was in the bow. A total of 16 x 50cm G6 torpedoes were carried and were identical to those carried by *Kaiser*. Illumination was provided by 8 x 120-ampere 110cm-diameter searchlights, four behind the aft funnel and four on the fore funnel.

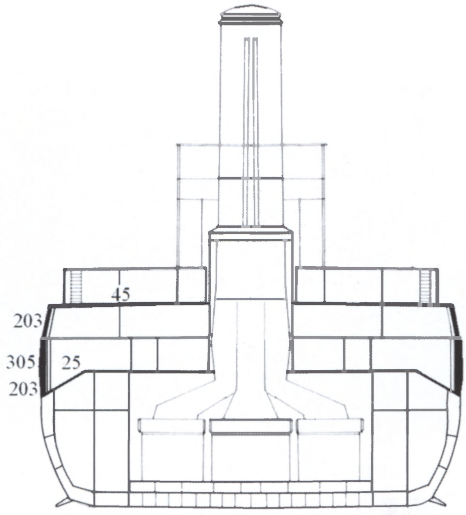
Armour

The battleships of the *König* class carried very thick and extensive armour, which weighed 10,440 tonnes and accounted for 40.5 per cent of the ships' weight. The main belt armour was 350mm thick and extended from the forward transverse bulkhead ahead of A turret to aft of E turret. This belt tapered to a thickness of 180mm at its lower edge. The aft belt was 180mm thick and the bow belt was 150mm thick. Citadel armour was 200mm thick and casemate armour was 170mm thick. Because naval medium artillery could range out to 168hm, almost 17km, an extensive citadel was essential to protect the hull, as the armour of *König* did during the Skagerrak battle.

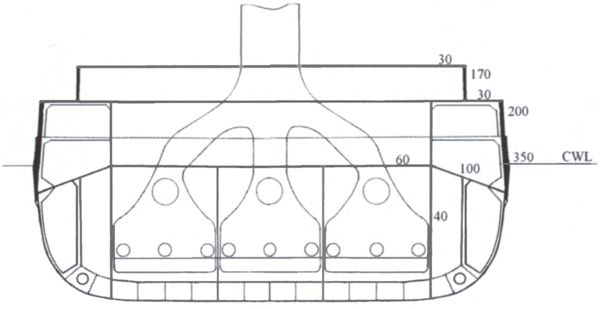
BELOW LEFT
The main charges for the 30.5cm heavy cannon were contained in brass cartridge cases. When a turret suffered a direct hit these charges mostly failed to burn, even when a turret was put out of action. After firing, the expensive cases were collected and preserved for later reuse. Here a brass cartridge is manhandled down a stairway from D turret of *Großer Kurfürst*.

BELOW RIGHT
Crew clean the barrels of the heavy calibre artillery aboard *Großer Kurfürst* after a practice shoot.





Iron Duke (1911)



König (1911)

ABOVE Comparative profiles of armour thickness and armour distribution of two battleships of 1911. Both ships show all the characteristics of the previous two designs, and when a comparison is made the British design exhibits all the same shortcomings. The armour of *König* is much thicker and covers a greater area than that of *Iron Duke*; the British ship has no torpedo bulkhead underwater protection, and there are far fewer watertight compartments.

The fact that *König* and other ships were struck by many medium-calibre shells, but remained undamaged by them, clearly invalidates the theory behind 'all or nothing' armouring. The main belt and citadel were closed by transverse armoured bulkheads of 170–200mm thickness.

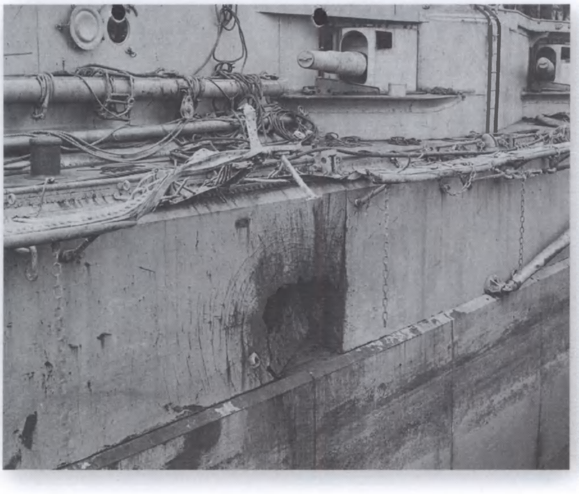
As with all ships of this period, the deck armour was not as extensively developed. The deck over the casemates was 30mm thick, while the armoured deck was 60mm thick and the sloping deck was 100mm thick. The armoured torpedo bulkhead remained as with the *Kaiser* class, with a thickness of 40mm.

At their thickest, the barbettes were 300mm thick. The turret sides and faces were also 300mm, while the rear was 150mm. The sloping turret roof was 110mm and the flat roof was just 80mm. The forward conning tower had 300mm armour, while the aft conning tower had 200mm armour.

Seakeeping

The ships of the *König* class had seakeeping qualities similar to those of the *Kaiser* class. The metacentric height was the same at 2.59m and therefore the ships were very stable, but possessed a rapid roll period. They had pleasant movements, but would pitch strongly. The speed loss in a swell was small and with hard-over rudder there was a 66 per cent speed loss and a heel of 8°. Generally, they were good sea ships.

BELOW The result of a 15in shell hit on the citadel armour of *Großer Kurfürst*. The shell detonated on impact and although a piece of armour was punched out, the shell was kept out and only fragments and splinters entered the ship. The armour thickness here is 200mm, while the belt armour just below is 350mm in thickness.



Machinery

There were 15 boilers of the Schulz-Thornycroft small-tube type. The three forward-most were oil fired, the remaining 12 were coal fired. The coal-fired boilers were equipped with supplemental oil firing from 1916. Steam was produced at 235psi and drove three sets of turbines of various construction types. The turbines drove three 3.8m-diameter propellers, and as with all Imperial Navy ships the designed power output was considerably overstepped.

Electrical power came from by four turbo- and two diesel dynamos, giving a total output of 2,040kW at 225 volts. The two rudders were mounted parallel to one another and were driven by two steam-powered rudder engines.

General characteristics and changes

Although generally very similar in appearance, there were some distinguishing characteristics between individual ships. *König* was completed with an admiral's bridge behind the forward conning tower, and *Markgraf* received the same in 1917. *Markgraf* had two steam pipes mounted inside the aft funnel casing. *Kronprinz* was completed with a heavy, tubular foremast with an artillery direction position.

After the Skagerrak battle, the torpedo nets were removed and heavy foremasts were progressively installed on the remaining three ships. *König* and *Markgraf* had similar foremasts in that the artillery position overhung the observation position, whereas *Großer Kurfürst* and *Kronprinz* had a larger observation position. In late April 1918 *Großer Kurfürst* had the 8.8cm light artillery removed and the gunport apertures were welded tight.

The battleship *Kronprinz* was completed with a heavy foremast and is seen here exercising in the North Sea, with battleships of the *Kaiser* class en-echelon to port and aft.

Service record

König

The keel for *König* was laid on 3 October 1911 at the Imperial Dockyard, Wilhelmshaven, and was ready for launching on 1 March 1913. The ship was commissioned on 9 August 1914, just after the outbreak of World War I. Trials followed and, after some teething problems, were concluded on 23 November 1914, after which the ship was ready to sortie. On 7 December, *König* grounded on Wilhelmshaven Roads, and the battleship immediately astern, *Großer Kurfürst*, had insufficient room to stop and rammed *König* in the stern to starboard. There was slight flooding and after coming free the ship went to Wilhelmshaven Dockyard and was under repair until 2 January 1915.

On 22 January 1915, *König*, along with the rest of III Squadron, went to the Baltic for training; therefore III Squadron was absent when the Doggerbank battle occurred. After tactical, artillery and torpedo training, the squadron returned to the North Sea on 11 February 1915. The ship took part in the advance to Terschelling on 29 March, which passed without incident. On 17–18 April *König* was part of the covering force for II AG, which lay mines near the Swarte Bank, and a further advance into the North Sea followed on 22 April. The next day the squadron returned to the Baltic for further manoeuvres and training, before returning to the North Sea on 10 May. The squadron put to sea on 17 May 1915 to cover a mine-laying operation by II AG on the Doggerbank, before returning the following day. A further advance into the North Sea was conducted on 29–31 May. A period of picket duty and training followed, interrupted on 6 July by a slight grounding.

On 11–12 September 1915, *König* was part of the force sent to cover a mine-laying operation off Texel. During this operation a torpedo boat of the anti-submarine screen was lost on a mine. On 23–24 October *König* and the High Sea Fleet made an abortive advance to interrupt merchant traffic between Skagen and England, then from 24 October to 4 November 1915 she lay in dock for repairs. From 5 to 20 December, *König* went to the Baltic for training and on the return journey there was a slight

König moored in Kiel with other ships of III Battle Squadron and II Reconnaissance Group. Behind *König* are *Markgraf*, *Bayern*, *Großer Kurfürst* and *Kronprinz*. To the left are the small cruisers SMS *Königsberg II*, *Karlsruhe II* and *Frankfurt*.

SMS *König* later in the war after the addition of the heavy tubular foremast with artillery direction position. Wooden life rafts were shipped and carried on the turret walls in late 1916/ early 1917.

grounding in the Kaiser Wilhelm Canal during a snow storm.

In January 1916, the previous commander of III Squadron, Vizeadmiral Scheer, was replaced by Konteradmiral Paul Behncke. The following day, 17 January, *König* went to the Baltic for training, before returning to the North Sea on 24 January. On 5–6 March and 21–22 April, *König* took part in the fleet advances without special occurrences, and on 24–25 April 1916 was part of the supporting force for the coastal raid by I AG to bombard Lowestoft and Great Yarmouth. From 1 to 8 May, *König* then went to the Baltic for training, including torpedo practice in the Mecklenburg Bight.

König took part in the Skagerrak battle on 31 May, and as the leading ship of the German line was engaged in the heaviest fighting. Highlights of the battle were:

- **31 May**

1746hrs – *König* opens fire on *Lion*, then *Tiger* and later *Barham.*
1839hrs – First enemy shots fall near *König*.
1846hrs – *König* under violent enemy fire. Three battleships of the British V Squadron took *König* under fire without the German battleship being able to reply.
1928hrs – *König* again under heavy fire.
1932hrs – *König* hit heavily and lists to port.
1938hrs – Splinter from a hit wounds Konteradmiral Behncke.
2007hrs – *König* takes light cruisers under fire, but again comes under heavy fire.
2201hrs – End of the day battle. *König* now at the end of the German line.

- **1 June**

0247hrs – *König* in battle with British destroyers.
1630hrs – *König* makes fast in the dockyard.

During the battle *König* suffered ten heavy- and five or six medium-calibre hits. One officer and 44 men were killed and 27 men were wounded. She went to Kiel for repairs and was in dockyard hands from 6 June to 26 July 1916. A training period in the Baltic followed before the ship returned to the North Sea on 5 August 1916.

On 18–20 August, *König* took part in the fleet advance in the direction of Sunderland, without contact with the enemy. From 21 October to 3 November, *König* then underwent further training in the Baltic, and on the return journey she participated in the squadron advance to Horns Reef on 5–6 November.

Picket and guard duty followed, and also some convoy escort work. There were further training periods in the Baltic from 22 February to 4 March 1917 and 14–22 March, and again from 17 May to 9 June. *König* was in the dockyard at Wilhelmshaven from 16 June to 21 July and had a new, heavy tubular foremast fitted, which contained an artillery direction position.

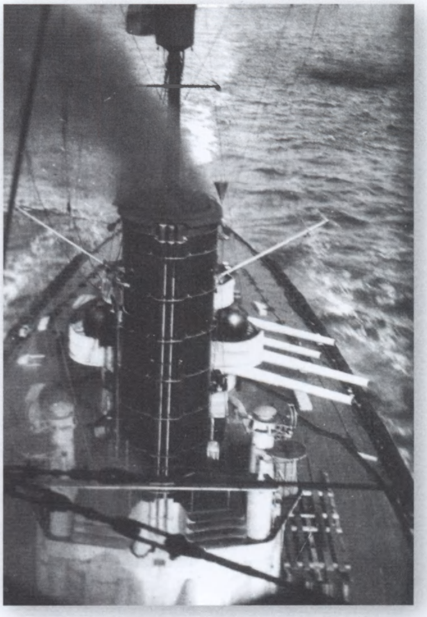
On 10 September 1917, *König* again went to the Baltic for individual and unit training and then joined the Special Unit for the conquest of the Baltic Islands. She departed Kiel on 23 September and went to Putziger Wiek, where she lay until 10 October. On the evening of 11 October, *König* began the journey to the north and at 0300hrs on 12 October she anchored off Tagga Bay on the island of Ösel to disembark troops enshipped aboard her. After that, at about 0550hrs, *König* took the battery on Cape Ninnast under fire. At 1730hrs she departed for Neufahrwasser for coal replenishment, after which she returned to the Irben Straits on 15 October. After a passage through the mine-infested waters and a failed submarine attack on 16 October, *König* arrived off the southern Moon Sound.

On 17 October, *König* and *Kronprinz* encountered two Russian destroyers off the southern Moon Sound and forced them to retire. Shortly afterwards, *König* joined battle with the Russian battleship *Slava*, which, however, outranged *König's* modern 30.5cm pieces with her own 12in cannon. After minesweepers cleared a path for *König* and *Kronprinz* to approach closer, the Russians were successfully engaged and *König* scored a total of seven hits on *Slava* and one hit on the armoured cruiser *Bayan*. Flooding aboard *Slava* meant she could not enter the dredged channel to escape to the north and she was scuttled by her crew. *König* also engaged the shore batteries at Woi and Werder. On 20 October, a landing section from the battleship occupied the island of Schildau. Six days later, on the homeward journey, *König* struck the seabed because of a heavy swell and 300 tonnes of water flooded into the ship. Repairs in Kiel were underway until 17 November 1917.

A deck-board view of *Großer Kurfürst* during exercises, with 15cm cannon trained for action.

For the remainder of 1917 and 1918, *König* undertook guard and picket duty in the North Sea and acted as cover for minesweeping units. Further training in the Baltic occurred from 22 December 1917 to 8 January 1918, and then 23 February to 11 March 1918. On 20 April 1918, *König* went to the assistance of light forces that were under attack from British forces, and in spring she took part in the fleet advance to the latitude of Bergen on 23–25 April 1918. Because of a mechanical failure aboard *Moltke*, however, the advance was aborted prematurely. On 30 May, *König* briefly grounded in the northern harbour of Helgoland. From 31 July to 1 August, *König* and III Squadron were part of the group covering minesweepers clearing Route 500. Further training in the Baltic followed from 7 to 18 August and 28 September to 1 October.

During all active operations, the aft funnel of German warships was painted red as a recognition device. Here the aft funnel of SMS *Großer Kurfürst* is coloured red and the aft turret group is trained to port. The funnels were repainted grey on the return journey before the ships came within sight of land.

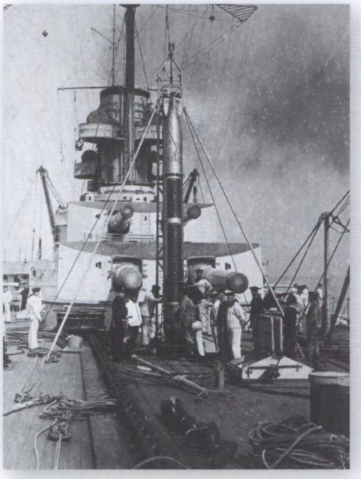


On 30 October 1918, *König* stood ready for the planned operation into the North Sea, but during the morning unrest broke out on several big ships, including *König*. The operation was called off and III Squadron was detached to Kiel, where *König* made fast in the Imperial Dockyard. During the turmoil of the revolution that followed, the commander was wounded three times, and the first officer and adjutant were both murdered.

König belonged to the formation of ships that were interned at Scapa Flow, but did not transfer there until later with the small cruiser *Dresden*, on 6 December 1918. On 21 June 1919, she was scuttled in deep water and remains there to this day.

Großer Kurfürst

On the same day as the keel for *König* was struck, 3 October 1911, the A.G. Vulcan dockyard in Hamburg laid the keel for *Großer Kurfürst*, and on 5 May 1913, the ship was launched. As the international political tension heightened during the summer of 1914, the work of completing the ship was accelerated so that



A torpedo is loaded into the forward broadside torpedo room of the battleship *Großer Kurfürst*.

on 15 July 1914 the first dockyard trials could be conducted. On 30 July, the flag and pennant were raised and the usual trials began. The ship was ready for operations on 25 October 1914, and therefore took part in the fleet operations on 2–3 November and 15–16 December 1914. On 7 December she lightly rammed *König*, but was not damaged herself.

The year 1915 proceeded without notable incidents and *Großer Kurfürst* took part in all the advances of the Fleet and training cruises in the Baltic. The year concluded with a training cruise in the Baltic from 5 to 20 December 1915.

Großer Kurfürst started 1916 with another training cruise in the Baltic, from 18 to 23 January. From 12 February to 3 March, she was in the dockyard at Wilhelmshaven and then a very busy year began. On 5–6 March she took part in an advance in the Hoofden, then on 23 March an advance to Amrum Bank. On 21–22 April there was a fleet advance to Horns Reef and on 24–25 April she provided distant support for the raid by I and II AG against the English coast.

During the Skagerrak battle, *Großer Kurfürst* was part of III Squadron, and as such formed the vanguard of the High Sea Fleet. During the pursuit of the British V Battle Squadron, it was estimated that *König* and *Großer Kurfürst* developed a speed of between 23 and 24 knots, but the rest of the squadron was slowly left behind. At 1849hrs, *Großer Kurfürst* opened fire and at 1907hrs received the first of a total of eight heavy hits. Her main armament and machinery remained undamaged, but her losses totalled two officers and 13 men killed, ten of them in the II port casemate, and ten men wounded. The repair work was carried out at the Vulcan Dockyard in Hamburg from 6 June to 16 July 1916.

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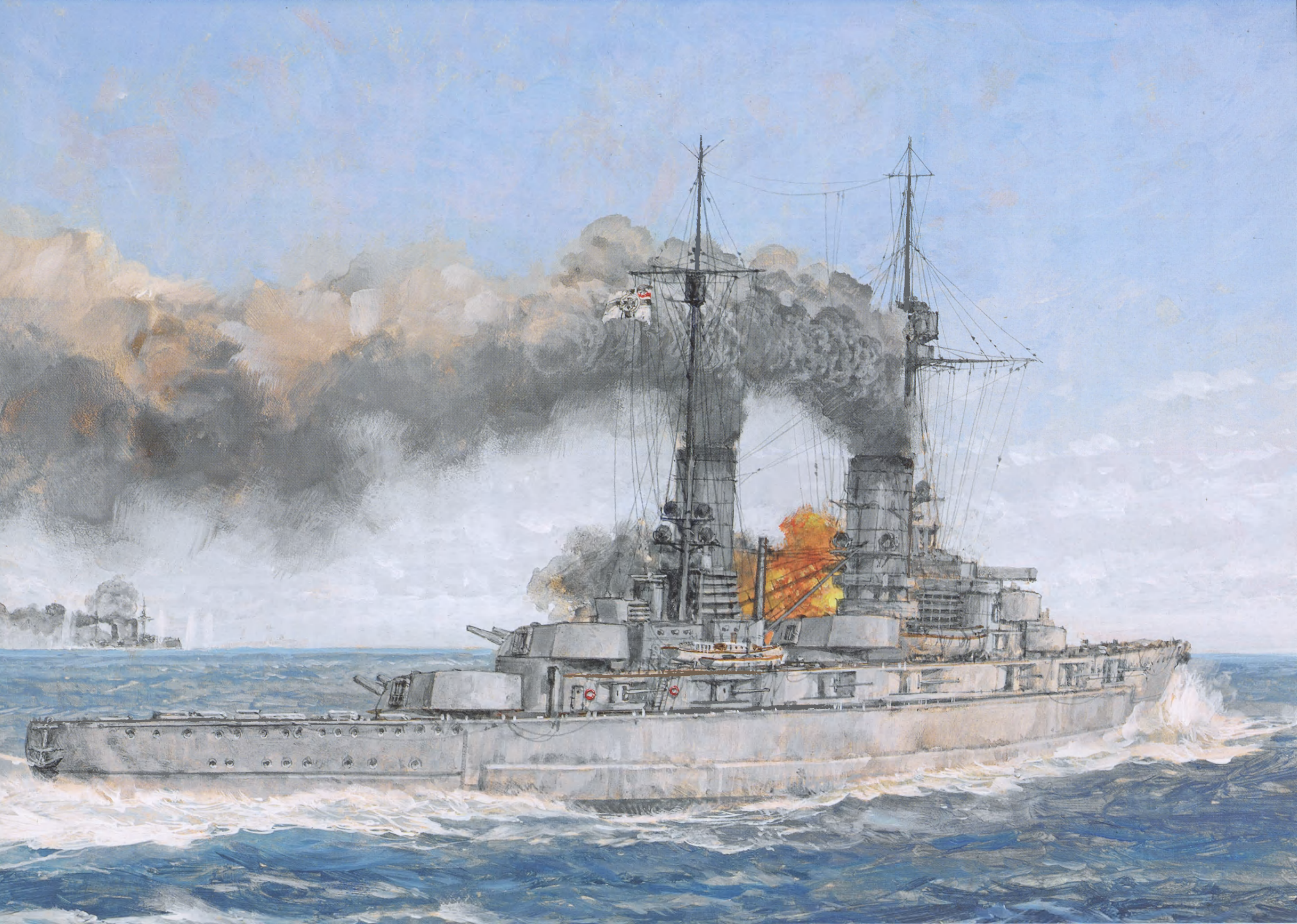
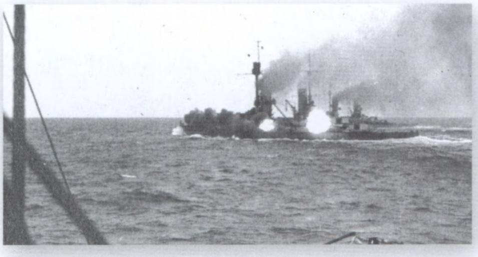
MOON SOUND, 17 OCTOBER 1917

In October 1917, battleships of squadrons III and IV of the High Sea Fleet participated in the operation to conquer the Baltic Islands. On 16 October, Vizeadmiral Behncke received orders to attack the Moon Sound the following day with the battleships *König* and *Kronprinz*, and two small cruisers, *Kolberg* and *Straßburg*. Early the next day, the German battleships were observed approaching the southern Moon Sound by the Russian destroyers *Deyatel'Nyi* and *Del'Nyi*, which were taken under fire by the battleship *König*, without effect. The destroyers quickly reported the approaching Germans to Vice Admiral Bakhirev, the commander of the Russian Sea Forces of the Riga Gulf. Courageously he ordered an advance against the two German super-dreadnought battleships with his greatly inferior force of the pre-dreadnought battleships *Slava* and *Graschdanin* (ex *Tsarevitch*), and the armoured cruiser *Bayan*, which served as his flagship.

Wisely, the Russian ships took the German minesweepers under fire at first, because if they could hold these up the entire German attack would stall before the minefields. Then at 0812hrs *Slava* opened fire on the German battleships. Some of the well-directed Russian fire fell just 50m from *König*, but when the German battleship returned fire at a range of 204hm the shot fell short. Vizeadmiral Behncke now found himself at a severe tactical disadvantage and was forced to reverse course and retire a little, as the Russian minefields prevented him from approaching closer.

At 0840hrs, he resumed his advance behind the minesweepers and by 1000hrs these had swept a path close enough to the Russians that Vizeadmiral Behncke could order 'utmost power' ahead. At 1013hrs *König* opened fire on *Slava* and four minutes later *Kronprinz* opened fire on *Graschdanin*. In a brief exchange, before the Russians retreated out of range, *Slava* was hit seven times and *Graschdanin* was hit twice, and then *König* hit *Bayan* once. With incredibly accurate shooting at extreme range, *König* had struck *Slava* seven times from only 60 shots fired, an unprecedented and unequalled 11.6 per cent hit ratio. *Slava* was unluckily struck below the waterline five times, so that 1,180 tonnes of water flooded the ship and the draught increased by around 1.5m, making it impossible for her to escape through the dredged channel to the Finnish Gulf. Therefore, after the other Russian ships had passed, she was scuttled near the channel entrance.





Großer Kurfürst at the moment of firing during a practice shoot. The artillery direction position on the foremast remains clear of funnel and gunfire smoke.

After training in the Baltic from 8 July to 4 August, the ship formed part of I AG during the advance against the English coast on 18–20 August. From 21 October to 2 November, she undertook training with III Squadron in the Baltic, although she only officially rejoined the squadron on 4 November.

On 5 November 1916, the U-boats U-20 and U-30 became stranded on the latitude of Bovbjerg and light forces were dispatched to recover them. III Squadron, en route to Wilhelmshaven, was diverted to cover them. Approximately 30 nautical miles north-west of Horns Reef at 1307hrs, *Großer Kurfürst* was torpedoed by the British submarine J1. The port rudder was blown off and the aft rudder rooms flooded, but the ship was able to maintain a speed of 19 knots. She was repaired at the Vulcan Dockyard from 10 November to 9 February 1917.

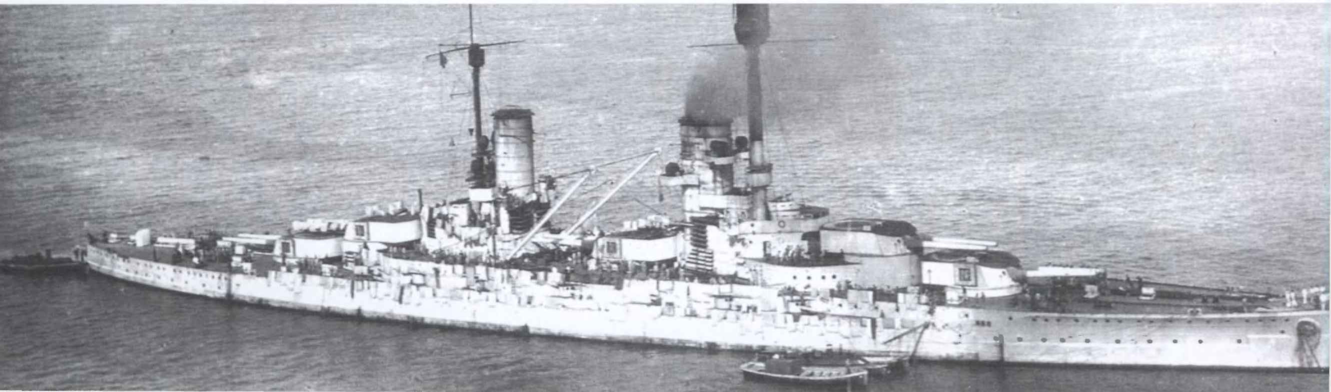
On 9 February, while en route to Kiel, *Großer Kurfürst* ran aground off Krautsand in the River Elbe, although the following day the ship came free. After training in the Baltic, she returned to the North Sea on 4 March, but on 5 March, during evolutions in the Helgoland Bight, *Großer Kurfürst* ran into her sistership *Kronprinz*. The bows were pushed in and the ship was under repair in the Imperial Dockyard at Wilhelmshaven until 22 April.

The ship was combat ready on 23 April, and from 17 May to 8 June 1917 there was unit training in the Baltic. Security and picket duty in the North Sea followed before returning to the Baltic for exercises from 11 to 21 September 1917. Then *Großer Kurfürst* went to Putziger Wiek in readiness for the attack on the Baltic Islands. While taking up her allotted bombardment position in Tagga Bay on 12 October, however, she ran onto a mine at 0509hrs. About 280 tonnes of water flooded into the ship, but nevertheless she could still carry out the bombardment and at 0551hrs she opened fire on the Cape Ninnast shore batteries. Later in the day she was detached to Kiel and from there went to Wilhelmshaven Imperial Dockyard, where repairs were carried and were completed by 1 December 1917.

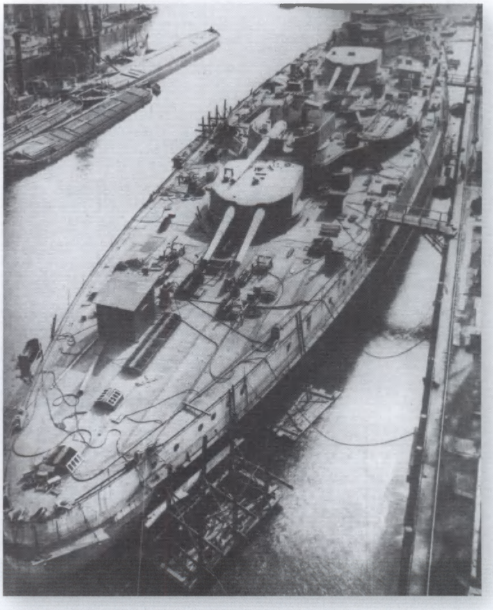
Picket and security duty followed in the North Sea, and *Großer Kurfürst* took part in the advance to Norway on 23–25 April 1918. On returning to Wilhelmshaven, the ship suffered damage while entering the lock. Repair work continued from 27 April to 2 May 1918. On 30 May, the bad luck continued when the ship grounded near the wreck buoy off the north harbour of Helgoland, whereby the port propeller shaft was bent. After two periods of repair work from 2 to 9 June and 21 to 31 July in the Imperial Dockyard at Kiel, the ship was again ready for service in the North Sea on 12 August 1918.

Großer Kurfürst stood ready for the aborted fleet advance on 30 October 1918. III Squadron was detached to Kiel and arrived there on 31 October. On 4 November 1918 mutiny broke out aboard *Großer Kurfürst* and the red

Großer Kurfürst at anchor on Wilhelmshaven Roads during the second half of 1918.



flag was hoisted. After returning to Wilhelmshaven, the ship was part of the internment unit that went to Scapa Flow and on 21 June 1919 *Großer Kurfürst* was scuttled by her crew.



The battleship *Markgraf* under construction by the firm of A.G. Weser. Turrets C and E are complete, while one barrel is still missing from D turret, as are the funnels and aft superstructure.

Markgraf

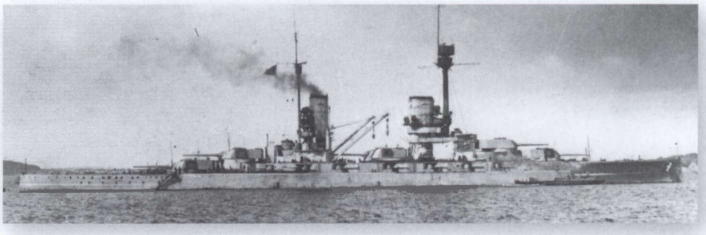
The keel for the third ship of the *König* class was laid by A.G. Weser in November 1911 and launching followed on 4 June 1913. On 1 October 1914, the new *Markgraf* was placed into service and trials were completed on 12 December so that by 10 January 1915 she was combat ready in III Squadron. During 1915, *Markgraf* took part in the squadron and fleet advances of 29–30 March, 17–18 April, 21–22 April, 17–18 May, 29–30 May, 11–12 September and 23–24 October.

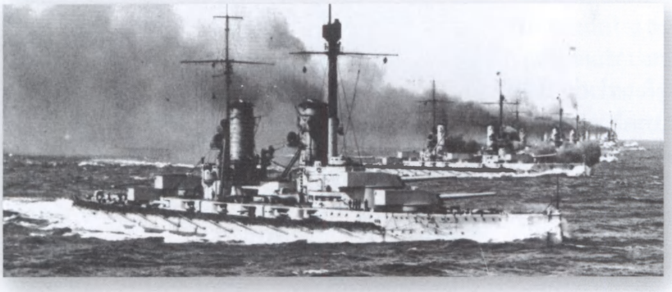
In 1916, *Markgraf* further undertook the advances on 5–7 March, 26 March, 21–22 April and 24–25 April. During the Skagerrak battle on 31 May 1916, *Markgraf* received a total of five heavy-calibre hits, including from 15in shells. Losses totalled 11 dead and 12 wounded. The most damaging hit struck the port VI casemate, where nine men were killed. On her return, *Markgraf* went to A.G. Vulcan in Hamburg for repair work, which was completed by 20 June 1916. After exercises in the Baltic, the ship was assigned tactically to I AG, and with this unit took part in the advance towards Sunderland on 18–20 August 1916. An advance to the middle of the North Sea followed on 18–20 October. After a further exercise period in the Baltic, III Squadron, including *Markgraf*, covered the recovery attempts for two stranded U-boats on 4–5 November 1916.

For *Markgraf*, 1917 was occupied mainly with picket and security service in the North Sea, interrupted only by training periods in the Baltic and a period in Kiel dockyard for several weeks for overhaul work in January. In September she took part in the Ösel operation and on 12 October 1917 she was involved in the bombardment of the battery at Cape Ninnast in Tagga Bay. Then, while III Squadron went to Putziger Wiek, *Markgraf* remained in Tagga Bay until 17 October 1917. On this day she quit the Bay to travel into the Riga Gulf to rejoin the squadron, but on 18 October at 1240hrs became fast at the entrance to Kalkgrund for a time before coming free. *Markgraf* anchored with her squadron north of Larina Bank on 19 October, and the following day moved her anchorage into the Moon Sound. On 25 October, she then conducted a bombardment of the island of Kynö. Two days later she anchored off Arensburg and on 29 October was detached from the Special Unit to return to the North Sea. While negotiating the narrow swept channel in the Irben Straits, she struck two mines on the starboard side at 1304hrs, one shortly after the other. A total of 260 tonnes of water flooded into the ship. *Markgraf* continued onwards to Neufahrwasser and then Kiel, before transferring to the Imperial Dockyard in Wilhelmshaven for repairs, which lasted from 6 to 23 November 1917.

During the further course of the war, *Markgraf* carried out the usual picket and guard duties, but did not take part in the fleet advance of 23–25 April 1918. At this time she lay in the

Markgraf moored in Kiel Bay later in the war after the addition of heavy foremast.





Imperial Dockyard, Kiel, from 15 March to 5 May 1918, for the mounting of a new, heavy foremast.

Markgraf stood ready for the aborted fleet advance on 30 October 1918, but there was some disobedience amongst the crew. Several men were arrested and put ashore. The ship belonged to the unit of interned ships and departed Wilhelmshaven for the last time on 19 November 1918. On 21 June 1919, she was scuttled by her own crew in 40m of water, whereupon the commander and a sailor were ruthlessly shot down in cold blood by British forces present.

ABOVE TOP
The battleship *Kronprinz* lying on the roadstead.

ABOVE BOTTOM
Kronprinz and III Squadron battleships of the *Kaiser* class at a practice shoot sometime before the Skagerrak battle.

Kronprinz

The last battleship of the *König* class was laid down at the Germania Dockyard in Kiel in July 1912. After the christening, *Kronprinz* was launched on 21 February 1914 and with the outbreak of war the completion of the new ship was accelerated with all haste. She was commissioned on 8 November 1914, instead of the planned date in spring 1915. On 2 January 1915, *Kronprinz* completed trials and took part in the fleet advance on 29–30 March. Thereafter she was involved in all the operations of 1915 and undertook training in the Baltic from 24 April to 13 May 1915. During a training shoot on 8 May, a premature barrel explosion occurred in the right gun of turret C.

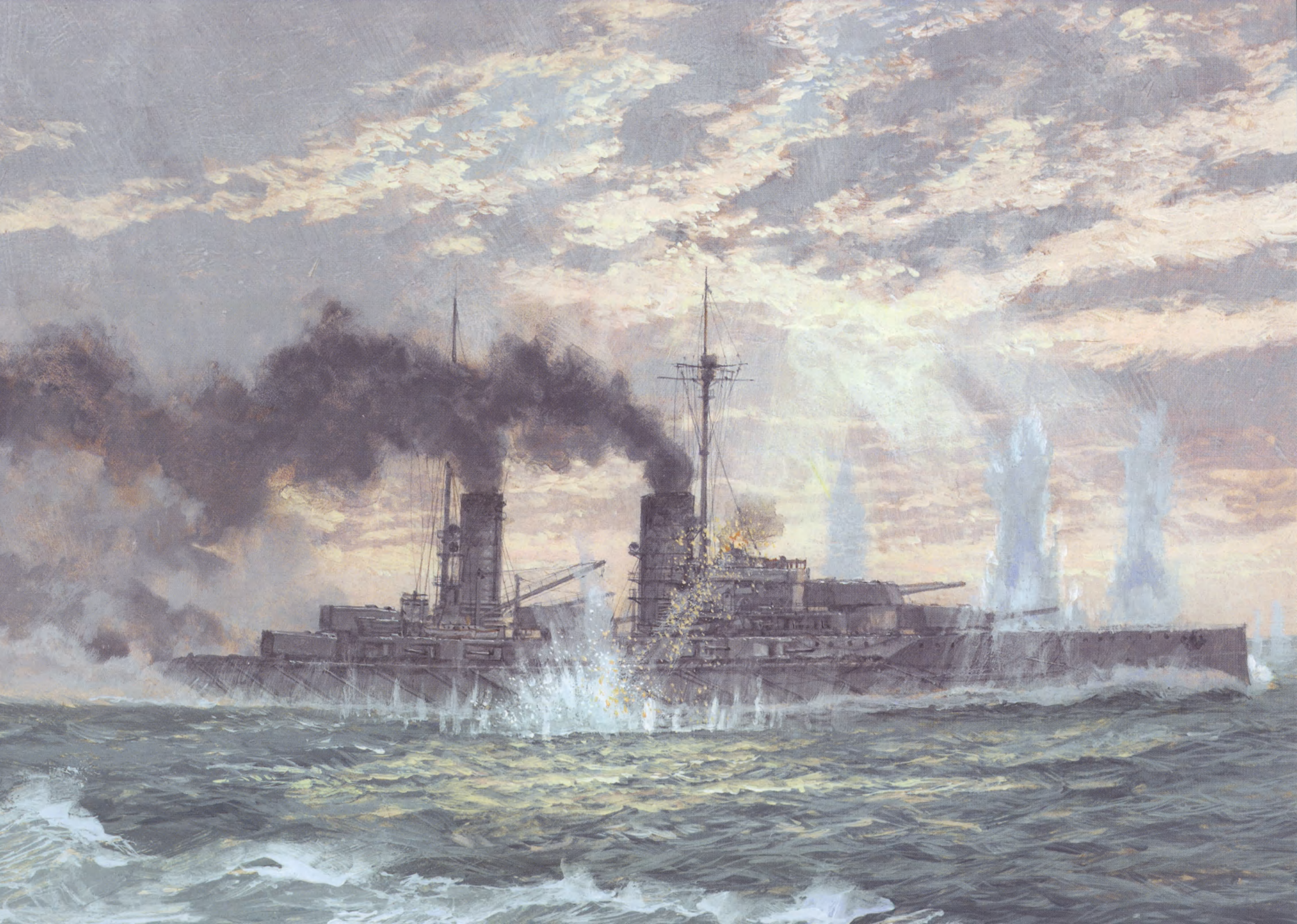
In 1916 *Kronprinz* took part in the fleet advance of 5–7 March to Terschelling and 31 March, plus the advance on 2–3 April. She also took part in the operation on 24–25 April 1916 as cover for the coastal raid on Lowestoft and Great Yarmouth.

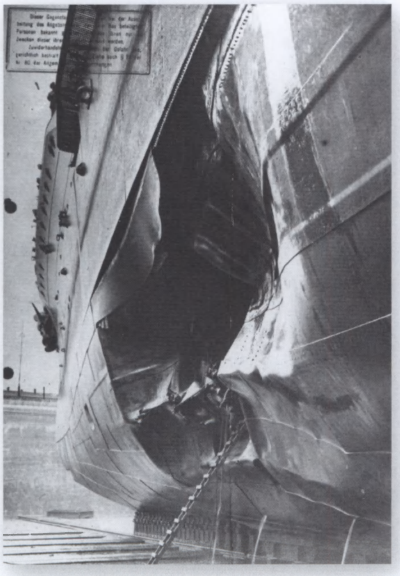
During the Skagerrak battle, *Kronprinz* was part of the vanguard of the Main Body, and while firing on various enemy targets, remained undamaged herself. On 16 July she undertook an advance to the north of Helgoland and on 18–19 August took part in the advance towards Sunderland. A further advance followed on 18–20 October, but there was no enemy contact. A period of training in the Baltic followed from 20 October to 2 November

F

KÖNIG IN THE SKAGERRAK BATTLE (JUTLAND)

With the position of leading the German High Sea Fleet battleline, SMS *König* came under the concentrated fire of numerous British battleships on several occasions during the Skagerrak battle. Shortly after the High Sea Fleet turned away for the first time, the battleship *Iron Duke* hit *König* with a 13.5in shell at 1937hrs. The projectile struck the roof of the forward conning tower, where the armour thickness was 170mm. The shell failed to penetrate and was deflected overboard, where it exploded just 50m distant. Fragments and splinters were thrown back over *König* and Konteradmiral Paul Behncke, who was standing outside the security of the conning tower, was wounded in the head. With the view from inside the conning tower restricted, many German commanders and admirals elected to stand outside on the exposed bridge, notably Kapitän zur See Harder of Lützow, and Vizeadmiral Scheer, commander of the High Sea Fleet. During the critical phase of the battle, Vizeadmiral Scheer went onto the open bridge, to get a better view of events unfolding, despite the fact heavy shells were falling all around. Then his flagship, *Friedrich der Große*, opened fire and the blast pressure from the forward turret sat him on his backside on the deck, and tore his coat off. Our battle scene shows the hit on *König*'s conning tower, the shell ricocheting away and exploding.





On 5 November 1916, *Kronprinz* was torpedoed by the British submarine J1. Although the external damage looks extensive here, the internal damage was slight and *Kronprinz* held her position and speed in the line. For a view of internal damage, see Osprey New Vanguard 124: *German Battlecruisers 1914–1918*, p.23.

1916. During the return journey to the Jade, III Squadron received orders to cover the forces rendering assistance to two stranded U-boats. On 5 November, the British submarine J1 succeeded in torpedoing *Großer Kurfürst* and *Kronprinz*. The torpedo struck *Kronprinz* beneath A turret and around 250 tonnes of water flooded into the ship; she was able to hold her place in the line, however.

From 6 November to 4 December 1916, *Kronprinz* lay in the Imperial Dockyard at Wilhelmshaven for repairs, and then undertook unit exercises in the Baltic, before resuming picket duty in the North Sea. During evolutions in the North Sea on 5 March 1917, *Kronprinz* was rammed by *Großer Kurfürst*, which caused a leak at the level of B turret and 600 tonnes of water flooded into the ship. Once again the battleship underwent repairs in the Imperial Dockyard, Wilhelmshaven, from 6 March to 14 May 1917.

On 11 September 1917, *Kronprinz* went to the Baltic for exercises, and then joined the Special Unit to take part in the conquest of the Baltic Islands. She bombarded Russian coastal batteries on 12 October, and after that returned to Putziger Wiek to coal. After traversing the mine-infested Irben Straits on 16 October. *Kronprinz* stood ready for the battle in Moon Sound on 17 October. During this battle, *Kronprinz* was matched against the Russian pre-dreadnought battleship *Graschdanin* (formerly *Tsarevitch*) and hit the Russian ship twice, remaining undamaged herself. The following day there was a slight grounding, and on 26 October a heavier grounding on the return journey to Kiel. Two days later *Kronprinz* went to Kiel Dockyard, and on 2 November to Wilhelmshaven, where repairs were carried out from 24 November 1917 to 8 January 1918.

Kronprinz took part in the fleet advance on 23–25 April 1918 to interrupt convoy traffic between Norway and Britain, but the operation was prematurely broken off because of damage to *Moltke*. Further picket and security duty followed. With effect from 15 June 1918, the name of the battleship was changed to *Kronprinz Wilhelm*, the name of the successor to the Imperial throne and last Crown Prince, who at the time was chief of an army group on the Western Front. In mid-September, the ship went for dockyard work in the Imperial Dockyard, Kiel, before returning to the North Sea. On 4 November, *Kronprinz Wilhelm* briefly returned to the Baltic.

Following the Armistice, *Kronprinz Wilhelm* was one of the ships of the internment unit and departed Wilhelmshaven on 19 November 1918, going to Scapa Flow via the Firth of Forth. On 21 June 1919, the ship was scuttled by her own crew, and a stoker was fatally wounded by small-arms fire from a drifter (trawler).

A fine view of the battleship *Bayern* while on trials in early 1916. It can be seen that *Bayern* was completed with torpedo nets. *Bayern* was completed without a main mast, and had a gaff for the naval ensign on the aft searchlight pedestal.

BATTLESHIPS OF THE *BAYERN* CLASS

The battleships of the *Bayern* class were last to be commissioned into the Imperial Navy. Not only were they the most modern and most powerful type, they represented Germany's bid not only to equal foreign designs, but to surpass them and take the lead in dreadnought development.

Under the provisions of the German Naval Law a new amendment was due in 1912. The amendment allowed for an increase in building tempo from two to three capital ships, including battlecruisers, per fiscal year for six years from 1912, with a construction time of three years per ship. If no amendment was undertaken, then at the end of that period there would be only 40 capital ships, instead of 60. Under the new amendment personnel requirements would increase by a further 14,500 men up until 1920. The cost for the 1912 amendment was estimated at an extra 348 million marks. However, Chancellor Bethman Hollweg prevented the amendment being included in the 1912 budget, and in January 1912 Tirpitz had to accept that the building tempo would alternate between two and three ships per year. Correspondingly, financing was reduced from 348 to 250 million marks. On the basis of the amendment, the new-build *T/Bayern* and the planned replacement *Ersatz Wörth/Baden* were included in the budget of 1913. The cost for each was 57.5 million marks, an increase of 8 million over the predecessor *Kronprinz* from the budget of 1912.

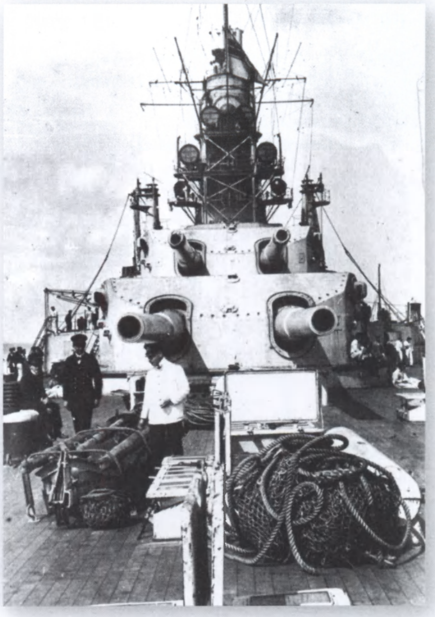
The principal question for the design work for the battleships was the calibre of the main armament. Because of the calibre increases in Britain and America, the option of a calibre size increase had already been discussed for *Kronprinz*, but had been rejected. In August 1911, Tirpitz arranged for the RMA to investigate mounting guns of 35cm, 38cm and 40cm calibres. Initially Tirpitz favoured 10 x 35cm as against 8 x 40cm cannon, but when it was pointed out by Krupp that 40cm was the largest practical size the English could construct with their present system of gun manufacture, he became convinced that the new battleships should be armed with this weapon. Nevertheless, when the amendment of 1912 was cancelled, it became necessary to replace the 40cm cannon with the cheaper 38cm piece. The question of triple turrets was also considered, but was rejected because of perceived disadvantages, notably the difficulty of loading the centre gun and associated decline in the rate of fire, and the risk of losing a greater proportion of firepower with the loss of one turret through breakdown or combat damage.

In June 1912, it was decided to defer the installation of a diesel engine on the centre shaft for the battleships of 1913, a measure that allowed further cost savings. On the question of speed, it was considered that 21 knots was sufficient, because every British battleship since *Dreadnought* was designed for this speed. News that the *Queen Elizabeth* class would have a higher speed only reached Germany in March 1913.

With *Sachsen* it was intended to install a diesel engine on the centre shaft. This, and other improvements, meant that *Sachsen* and *Württemberg* displaced more, and therefore their dimensions were slightly enlarged to maintain the same speed. Nevertheless, when war broke out on 1 August 1914, the engine plant specifications were changed to that of *Bayern* in order to keep delays to a minimum.

Armament

The heavy-calibre armament of the *Bayern* class consisted of 8 x 38cm SK L/45 set in Drh.L C/13 mounts. Each barrel rested in a cradle that had two hydraulic braking cylinders filled with glycerine, and run out was by an air recuperator. The cannon was fired either electromagnetically or by hand lanyard. The breech block was the normal wedge type. Turrets were trained electrically and the guns were elevated hydraulically from -8° to +16°, which gave a range for the 750kg armour-piercing shell of 204hm. After modification to an elevation of +20°, the range



A close-up view of the aft artillery of SMS *Bayern*. The ensign gaff can be seen, and likewise the two aerial spreaders for the wireless aerials.

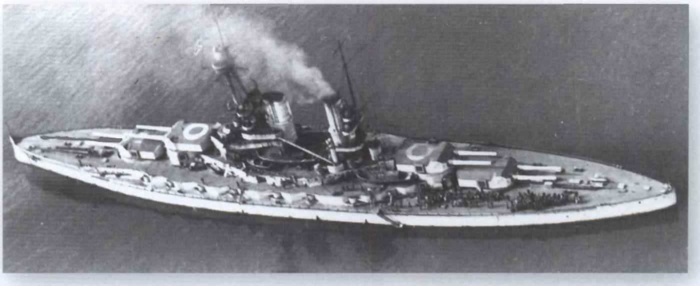
	Bayern	*Baden*	*Sachsen*	*Württemberg*
Building dockyard	Howaldtswerke, Kiel	F. Schichau, Danzig	Germaniawerft, Kiel	A.G. Vulcan, Hamburg
Budget name	*'T'*	*Ersatz Wörth*	*Ersatz Kaiser Wilhelm I*	*Ersatz Kaiser Friedrich III*
Building number	590	913	210	19
Keel laying	22 January 1914	20 December 1913	4 January 1915	7 April 1914
Launch	18 February 1915	30 October 1915	20 June 1917	21 November 1916
Commissioned	18 March 1916	19 October 1916	—	—
Displacement (tonnes)	Normal: 28,530 Loaded: 32,200	Normal: 28,530 Loaded: 32,200	Normal: 28,800 Loaded: 32,200	Normal: 28,800 Loaded: 32,200
Length (metres)	180.3	180.3	182.4	182.4
Beam (metres)	30.0	30.0	30.0	30.0
Draught (metres)	9.31	9.31	9.3	9.3
Moulded depth (metres)	14.8	14.8	14.8	14.8
Engine Plant	3 sets of Parsons turbines	3 sets of Schichau turbines	2 sets of Parsons turbines & 1 M.A.N. six-cylinder, two-stroke diesel	3 sets of A.G. Vulcan turbines
Performance (shaft horsepower)	Designed: 35,000 Maximum: 55,967	Designed: 35,000 Maximum: 56,275	Designed: 54,000	Designed: 48,000
Revolutions per minute	263	259	265	265
Speed (knots)	Designed: 21.0 Maximum: 22.0	Designed: 21.0 Maximum: 22.1	21.0	21.0
Fuel (tonnes)*	Construction: 900 Maximum:3,400 Fuel oil: 620	Construction: 750 Maximum: 3,400 Fuel oil: 620	Construction: 500 Maximum: 3,100 Fuel oil: 900	Construction: 500 Maximum: 2,700 Fuel oil: 1,300
Range (nautical miles)	5,000 at 12 knots 2,390 at 21.5 knots	5,000 at 12 knots 2,390 at 21.5 knots	With diesel motor alone: 2,000 at 12 knots	5,000 at 12 knots 2,390 at 21.5 knots
Cost (millions of gold marks)	49 to 50	49 to 50	—	—
Compartments	17	17	—	—
Double bottom (as percentage of length)	88	88	88	88
Crew	42 officers 1,129 men	42 officers, 1,129 men As flagship a further 14 officers and 86 men		

*Coal, unless otherwise indicated

was improved to 232hm. Initial muzzle velocity was 800mps and a total of 720 shells were provided.

The propellant was 277kg of RP C/12 cordite in a silk bag fore charge and a main charge brass cartridge. The munition chambers for the charges were on the upper platform deck, while the shell rooms were located beneath them on the lower platform deck. Because of the heavy weight of the shells and charges, an elevator ran from the munition chambers directly to each turret, delivering the shells and powder between the two guns. From there the components were pushed onto a munition car, which ran on rails to present the shell and charges to the breech. A hydraulic rammer completed the loading sequence. Beneath turrets A, B and C there was also a platform on which ready munition could be stored, which was conveyed directly behind the guns by an auxiliary elevator. The maximum rate of fire achieved was 2.5 shots per minute.

The medium-calibre artillery comprised 16 x 15cm SK L/45 cannon on MPL C/1913 mounts inside the casemates. The 45.3kg shells could be fired to a range of 165hm at a rate of seven shots per minute, with a muzzle velocity of 835mps. A total of 2,560 shells were carried, 160 per gun.



An aerial view of *Bayern* later in her career. The view shows the classic design layout of the heavy artillery, with extensive fields of fire. The main mast and 8.8cm Flak cannon have been mounted.

As designed, these ships were to mount 8 x 8.8cm Flak L/45 MPL C/1913 cannon; neither shipped any when completed, however. Subsequently, both received an outfit of 4 x 8.8cm guns, *Bayern* having them mounted about the aft funnel, and *Baden* mounting two adjacent to the fore funnel and two adjacent to the aft funnel. The 9kg shells could be fired at a rate of 15 shots per minute and had a horizontal range of 118hm. The guns could be elevated to an angle of 70°.

The *Bayern* class carried the new larger 60cm H8 torpedoes. With a length of 8m and weight of 2,000kg, they carried a warhead weighing 210kg and had a range of 6,000m at 36 knots, and 14,000m at 30 knots. There were four broadside tubes and a bow tube and a total of 20 torpedoes were carried. When *Bayern* struck a mine in October 1917, it was thought that the air flasks of the torpedoes, under a pressure of 440psi, had exploded and contributed to the destructive effect, and thereafter the broadside tubes were removed from both ships and the large torpedo rooms were sectionalized.

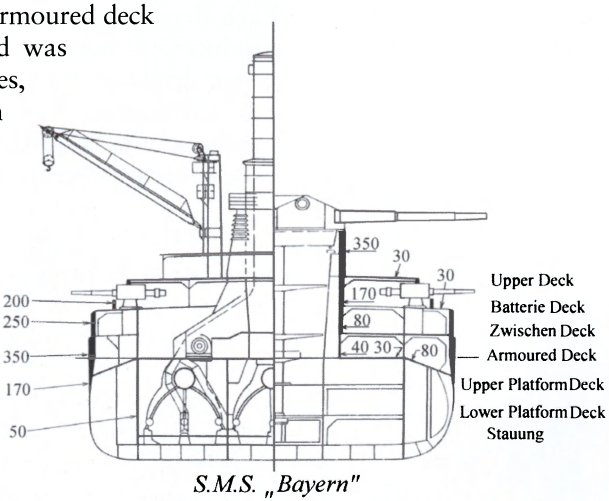
Eight 110cm searchlights were mounted: four on the foremast and four on a pedestal behind the aft funnel. The searchlights were controlled remotely from independent control positions. As completed, *Bayern* had a smaller emergency searchlight mounted on the foremast.

Armour

The armour of the *Bayern* class was similar in thickness and extent to the preceding *König* class. The main belt was 350mm thick and tapered to 170mm at its lower edge. Citadel armour was 250mm and the casemate armour was 170mm. Bow armour was 250mm and the stern armour was 170–100mm. The transverse bulkheads were 200 to 350mm. The armoured deck over the casemates was 40mm thick, the battery deck was 30mm and the armoured deck itself was 30mm on its horizontal part – the sloping armoured deck was 80mm thick. The armoured torpedo bulkhead was increased to 50mm thickness. Turrets had 350mm faces, 200mm upper sloping faces, 250mm sides and 120mm roofs. The barbette armour had a maximum thickness of 350mm. The forward conning tower was 350mm with a 180mm roof, the aft conning tower 200mm with an 80mm roof. Both *Bayern* and *König* had thicker armour over a greater extent than their foreign contemparies.

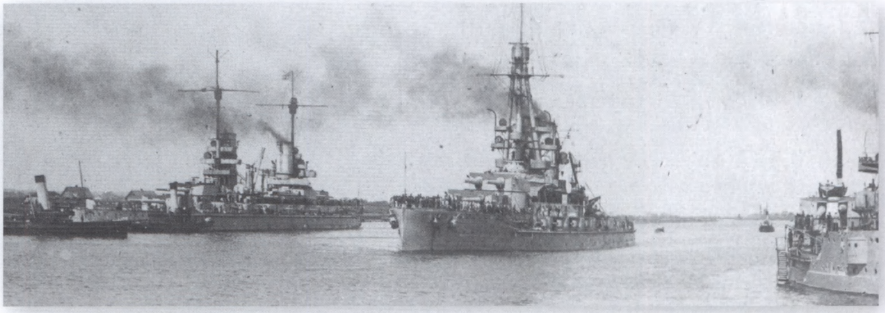
Seakeeping

Bayern is described as a very good sea boat, which turned and manoeuvred well, although it would pitch in a swell but would not lose weigh and slow down. To bring the ship to a stop from full speed took 1 minute 55 seconds and 790m,



S.M.S. „Bayern"
Frame 66 Frame 108
Armour thickness in mm.

Bayern in Wilhelmshaven harbour, passing by *Friedrich der Große* and a battleship of the *Nassau* class.



or 4.4 times the ship's length. With hard rudder there was a 62 per cent speed loss and 7° heel. The radius of turn was 320m or 1.8 times the ship's length. Metacentric height was 2.53m, which gave a roll period of 13.4 seconds.

Machinery

Bayern and *Baden* had 11 naval coal boilers and three naval oil-fired boilers. The coal boilers had supplemental oil firing. Steam was provided at a pressure of 235psi or 264psi with forced draught. The aft I boiler room housed six boilers in three divided rooms, II boiler room housed five boilers, the aft two divided by a turbo dynamo room. The forward III boiler room contained three oil boilers. *Württemberg* had only nine coal-fired boilers and *Sachsen* was designed with just six.

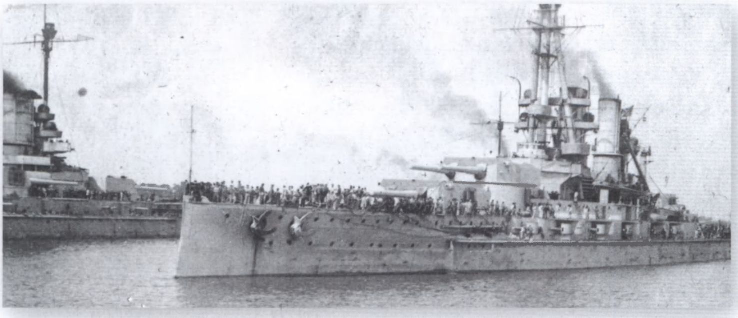
Bayern had three sets of Parsons turbines, while *Baden* had Schichau turbines and *Württemberg* had A.G. Vulcan turbines. There were six engine rooms, with the high-pressure turbines in the forward rooms and the low-pressure and astern turbines positioned in the larger aft engine rooms, along with the main condenser units. The high- and low-pressure turbines acted on the same shaft, driving a 3.87m diameter propeller.

As designed, *Sachsen* was to have two sets of Parsons turbines and a 12,000hp MAN 6-cylinder two-stroke diesel engine driving the centre shaft, which could propel the ship at 12 knots on its own. After the outbreak of war, however, it was ordered on 2 August to complete *Sachsen* with the same engine plant as the others of this class.

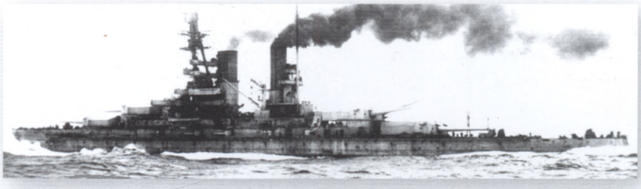
Bayern was equipped with two parallel rudders, each operated by identical steam rudder engines driving each rudder by a spindle screw drive. Each drive could also be operated by hand. A desalination plant could produce 300 tonnes of fresh water per day, more than adequate for feed water, drinking and washing water. The electrical system was powered by four turbo-generators each providing 400kW and two diesel generators providing 300–400kW at 225 volts. As designed, *Sachsen* and *Württemberg* were to have six diesel dynamos.

The *Bayern* class had a different type of drainage and flooding system to the preceding classes and the battlecruisers. The previous ships had a continuous loop system, whereas *Bayern* had an individual group system, consisting of five autonomous groups located to cover all required compartments. There were six dedicated leak pumps and these were supplemented by three

SMS *Bayern* entering Wilhelmshaven harbour in late 1916.



cool water pumps of the condensers and two auxiliary cool water pumps. There were also several small, portable leakage pumps.



The powerful form of SMS *Baden* pushing through the sea. *Baden* was initially fitted with two sets of yards on the foremast.

General characteristics and changes

Bayern was completed without a main mast, but this was shipped in 1917. The wireless aerials were carried by aerial spreaders. *Bayern* was only fitted with a night control position beneath the foretop in 1917, and the searchlight was removed from the upper mast. As completed, *Baden* carried temporary extra yardarms on the foremast. The 8.8cm Flak guns were initially not mounted, but were fitted in 1917. *Baden* was easily recognized by the admiral's bridge mounted about the tripod mast.

Service history

Bayern

On 22 January 1914, the keel for the new battleship was laid at Howaldswerke, Kiel. The ship was launched on 18 February 1915, and was completed on 18 March 1916, after the remarkably short time of just 26 months. The trials lasted 2½ months so that *Bayern* missed the Skagerrak battle, as the crew were given leave – the 38cm guns of *Bayern* would have been most welcome in the battle. On 15 July, *Bayern* joined III Squadron in Wilhelmshaven and during her first advance with the High Sea Fleet on 18–20 August 1916 she was apportioned to the 'Fast Division' with the cruisers of I AG. A further operation followed on 18–20 October 1916.

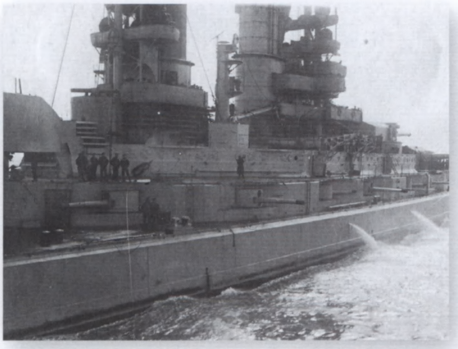
Bayern was again in III Squadron, which formed part of the Special Unit, for the conquest of the Baltic Islands in October 1917. While off the Soelo Sound she received a mine hit to port at the level of the forward broadside torpedo room at 0507hrs on 12 October. The forecastle sank 2m lower as 1,000 tonnes of water flooded into the ship. Because of a mistaken report, it was thought that the forward armoured transverse bulkhead was working, but this impression was incorrect as measurements were taken against A turret barbette, which was mounted on springs and could give up to 50mm. Nevertheless, the bulkhead was shored up with timber and on 31 October *Bayern* reached Kiel, where repairs were carried out from 3 November to 27 December 1917. During this time the bow broadside torpedo tubes were removed and 4 x 8.8cm Flak guns were mounted.

During 1918, *Bayern* undertook security and picket duty in the North Sea and participated in the fleet advance to Norway of 23–24 April 1918. *Bayern* stood ready for the aborted fleet operation on 30 October 1918. The next month, *Bayern* was one of the ships interned at Scapa Flow and was scuttled by her crew on 21 June 1919.

Baden

The Ferdinand Schichau Dockyard in Danzig laid the keel for *Baden* on 20 December 1913. Launching followed on 30 October 1915, but commissioning was not until 19 October 1916 because the shipyard was overstretched. The commander and most of the crew came from the sunken battlecruiser *Lützow*. After the completion of trials and training, *Baden* was commissioned as fleet flagship on 14 March 1917.

Baden took part in all the normal exercises and operations of the High Sea Fleet. At the end of August 1917, she conveyed the Kaiser, Wilhelm II, to Helgoland and returned him to Cuxhaven, escorted by *Derfflinger*, *Emden II*



A close-up view of *Baden* amidships. The extent of the heavy citadel and belt armour is visible and likewise the casemate armour. The deckhouse contained many officers' cabins and was considered a successful arrangement.

and *Karlsruhe II*. At Cuxhaven the ship had a slight grounding, but no damage was caused. In April 1918 *Baden* participated in the fleet advance to Norway, but there was no enemy contact. On 24 May 1918, *Baden* again journeyed to Helgoland and Cuxhaven; this time Admiral Scheer hosted the Grand Duke Friedrich von Baden, and the ship was escorted by the small cruiser *Karlsruhe II*.

At the end of October 1918, *Baden* stood ready as fleet flagship for the aborted operation against trade between Holland and Britain, and the Grand Fleet. After this unrest broke out aboard some of the ships and the squadrons were dispersed.

For some reason, *Baden* was not included on the list of ships to be interned at Scapa Flow under the terms of the Armistice, whereas the incomplete battlecruiser *Mackensen* was. Therefore *Baden* was not transferred with the bulk of the fleet, but only began the trip to Scapa Flow on 7 January 1919. On 21 June 1919, the order to scuttle *Baden* was given, but before the ship sank she was boarded by British seamen and was subsequently beached. *Baden* was expended as a target ship south-west of Portsmouth on 16 August 1921.

Sachsen

On 7 April 1914, the Krupp Germania Dockyard in Kiel laid the keel for the third ship of the Bayern class, *Sachsen*. In contrast to her sisterships, *Sachsen* was designed with just two sets of turbines and a 6-cylinder two-stroke MAN diesel working the centre shaft. However, after the outbreak of war the design was changed to that of the others. On 21 November 1916, *Sachsen* was launched, but work was ceased with just nine months' work remaining before completion. The incomplete ship was sold in 1920 and was broken up in Kiel in 1921.

G

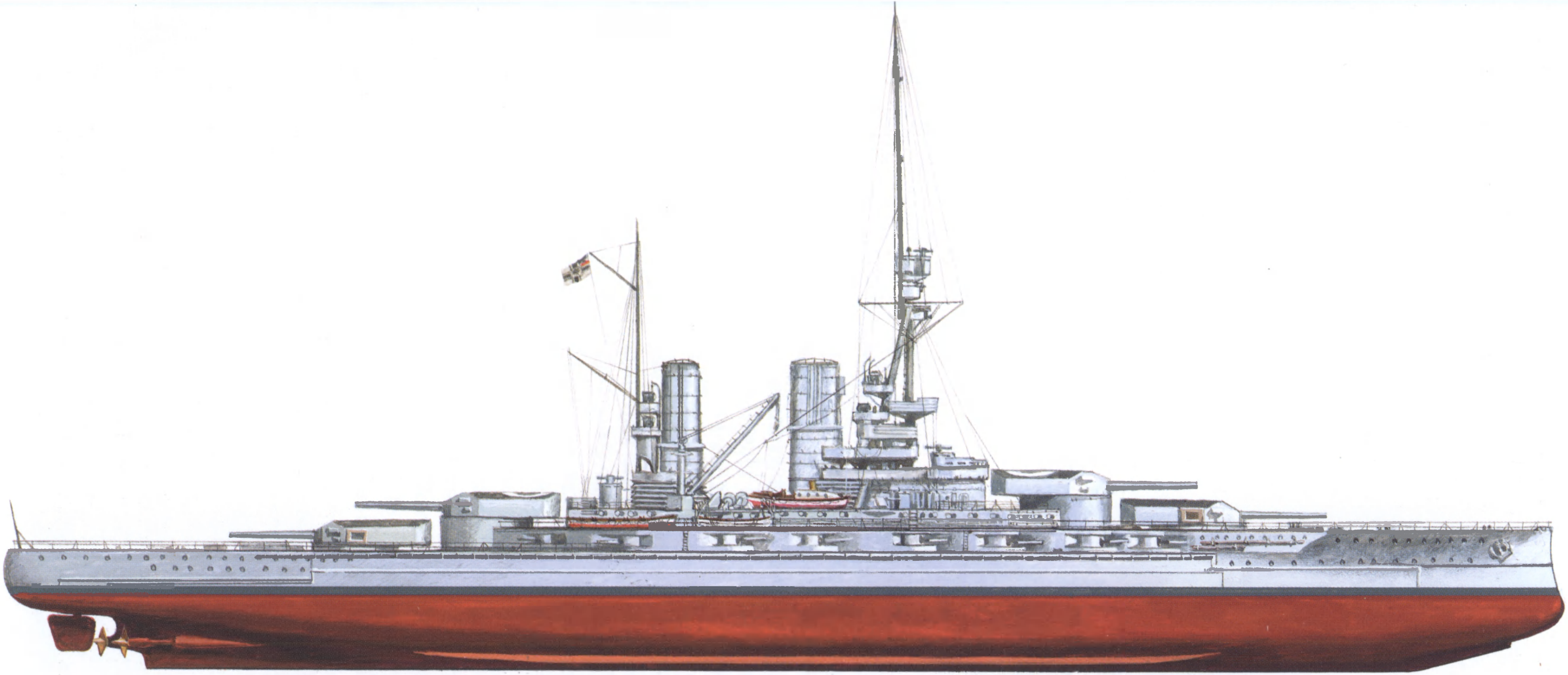
BAYERN CLASS

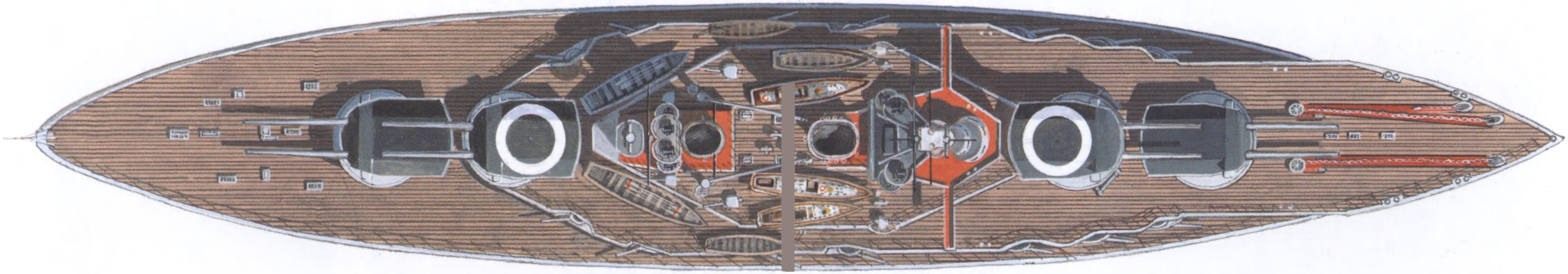
The battleships of the *Bayern* class were the last to be completed for the Imperial Navy. They represented a belated attempt not only to equal foreign contemporary battleships, but to surpass them. With this class Germany moved to the design layout that was to become the normal standard configuration, with two superfiring groups forward and aft for the eight heavy-calibre weapons. This disposition gave an excellent all-round field of fire for the guns, and none of the arguments used previously to delay the utilization of this layout proved to have any merit. This design also had the advantage of allowing a large deckhouse, which was used to house many officers' cabins, giving them a bright and airy position.

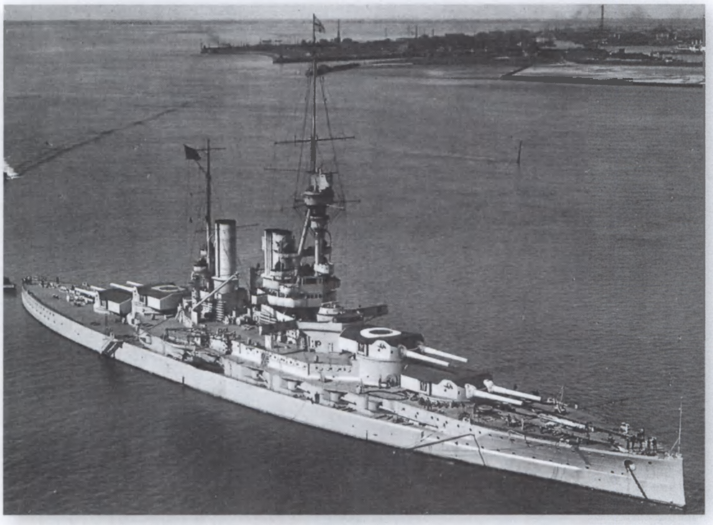
The armouring of the *Bayern* class held to the principle of covering almost the entire hull side, whereas in the United States the *Oklahoma* class had only the waterline covered by a thick belt, working on an 'all or nothing' rule. Just as with all battleships since *Kaiser*, the belt was 350mm thick, but the citadel armour was increased in thickness to 250mm. The turrets and barbettes had greatly thickened armour. Yet from the belief that battles would be fought at reduced ranges, the deck armour was not as thick as in contemporary navies. Visibility ahead from the heavily armoured forward conning tower was not good, as to save weight and reduce the centre of gravity this was of minimum height.

The foreship of this class was bigger essentially for two reasons: to provide buoyancy for the greater weight concentrated in the foreship, being two 38cm turrets and the heavily armoured conning tower, and to provide space for the launching and storage of the larger H8 torpedoes. Therefore the full lines of the foreship resulted in increased water resistance at speeds above 22 knots, and this was relieved somewhat by the greater length of the last two ships of the class.

The *Bayern* class was the final powerful class of German battleships of this era, representing a considerable technical advance and a particular success. At the same time, they presented a harmonious appearance.







Baden served as flagship of the High Sea Fleet and is seen here on Wilhelmshaven Roads flying the flag of Admiral Scheer.

Württemberg

On 4 January 1915, the firm of A.G. Vulcan in Hamburg struck the keel for the last ship of the *Bayern* class, *Württemberg*. On 20 June 1917, she was launched. At the end of the war, however, 12 months' work remained outstanding and she was scrapped in Hamburg in 1921.

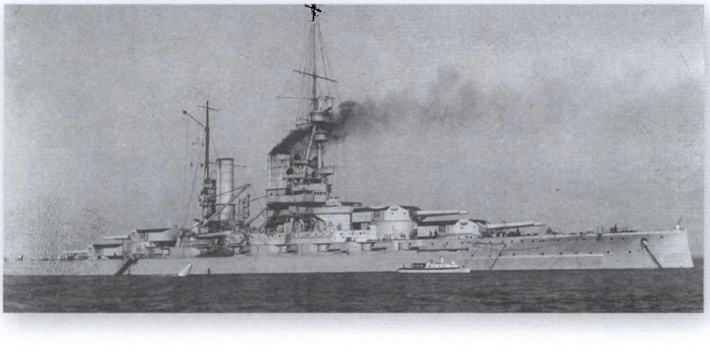
CONCLUSION

The German battleships of World War I were conceived and developed over a long period of time that encompassed great technological advance. Germany kept pace with new developments in weapons, armour and propulsion. The German battleship designs were conceived with steadfastness as the primary criteria, and in this they totally succeeded. The combination of thick armour, compartmental construction, great beam, good drainage arrangements and proficient damage control combined to produce ships that were almost unsinkable. Their armaments were fully capable of destroying the enemy, and year for year their weapons were the equal of contemporary navies, even if of slightly smaller calibre.

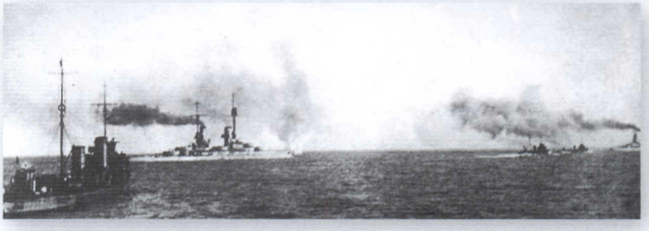
While the Skagerrak battle (Jutland) could not be counted as an emphatic German victory, it did bring home some unpleasant truths for the Grand Fleet. At a time when the British public were expecting a decisive victory of the scale of Trafalgar or Tsushima, the Grand Fleet found itself incapable of defeating the German battleships of the High Sea Fleet. The British ships lacked the offensive capabilities to defeat the steadfast German ships, while their own defensive capabilities were questionable. The Grand Fleet leadership lacked the confidence and resolve to engage the German ships in a close battle. Therefore it is not surprising that the High Sea Fleet was able to outmanoeuvre and outfight the British and inflict almost twice the losses in men and ships that they suffered. As a consequence of the battle, the British admirals agreed to surrender most of the North Sea to Germany and began to concentrate their efforts on mine warfare in an attempt to confine the High Sea Fleet and U-boats.

Because of Germany's geographical location, even the most successful conclusion to a fleet battle would still not bring about an end to the blockade by the Royal Navy. The position of Great Britain across the sea approaches to Germany meant that a blockade could be mounted with even the most modest of sea forces. The presence of the High Sea Fleet meant the German minesweeping forces were able to continue their work and allow the prosecution of the U-boat war against trade shipping. Yet the German battleships were perfectly capable of offensive action when it suited them. In August and October 1916, offensive advances were carried out without hesitation, and it was only due to

The battleship *Baden* lying on Wilhelmshaven Roads.



misfortune that another fleet action did not occur on 19 August. A further offensive advance was planned for early 1917, but was postponed and finally cancelled. In October 1917, the most modern battleships were dispatched to conduct Operation *Albion*, the capture of the Baltic Islands, to hasten Russia's exit from the war. The operation was an unqualified success, as was the following action to evict the communist Bolsheviks from Finland and give the country independence. All these operations proved that the High Sea Fleet, with its battleships, was an important weapon capable of carrying out the military and political will of the admiralty staff and government. The steadfast and potent battleships of the Imperial Navy had proved impossible to overpower, even by the most powerful contempory navies.



ABOVE TOP
SMS *Großer Kurfürst* entering the northern lock of III Entrance to Wilhelmshaven.

ABOVE
The battleships *Kronprinz*, to the left, and *König*, to the right, in the battle in Moon Sound, 17 October 1917. A shell impact from the Russian battleship *Slava* can be seen off the port bow of *Kronprinz*. At first the German dreadnoughts were unable to make reply because their weapons were outranged by the 12in guns of the Russian pre-dreadnought.

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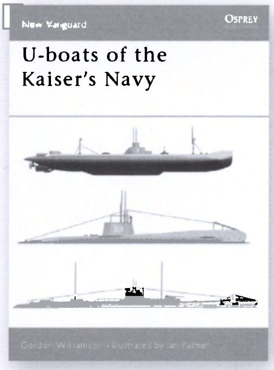
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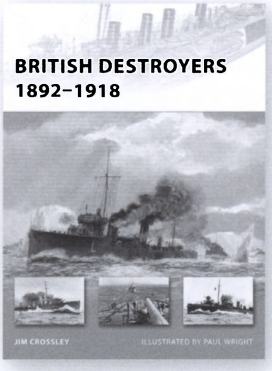
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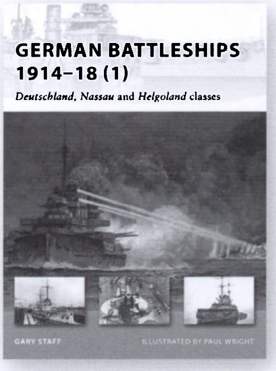
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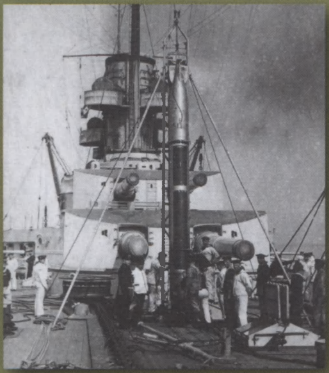

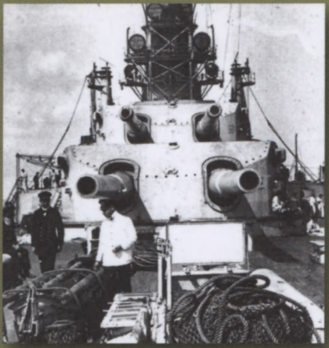

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Kaiser, *König* and *Bayern* classes

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